III. ANALYSIS RESULTS

This study assessing the nutrient adequacy of the diets of vulnerable subgroups has yielded a comprehensive and very detailed set of analysis results on the usual intake distributions of the various subgroups and how intakes compare with requirements. This chapter presents these results. For each subgroup examined, four tables summarizing the usual nutrient intake distributions are presented: (1) micronutrient intake; (2) estimated energy requirements and usual energy intake; (3) macronutrient intake; and (4) dietary fiber intake. Because of small sample sizes for food-insufficient households, these results are presented in the appendix.

The analysis presented in this report is descriptive only. Some of the high-risk subgroups have data presented on comparison subgroups: overweight and non-overweight individuals, low-income and higher-income individuals, food assistance program participants and income-eligible nonparticipants, and school nutrition program participants and nonparticipants. These comparison subgroups are intended to provide a context for interpreting the nutrient adequacy of the diets of the high-risk subgroups and should not be interpreted as suggesting impacts of the factors or characteristics that distinguish the groups. The individual comparisons do not account for other factors affecting nutrient intake, or for potential selection bias affecting comparisons of program participants and nonparticipants who may differ in important and unobservable ways.

A. SUMMARY OF KEY ANALYSIS RESULTS

Overall, the empirical findings show inadequate intakes of key micronutrients, imbalances in fat and carbohydrate intake, and inadequate intake of fiber. In general, children have more nutritionally adequate diets than adults. Dietary intakes appear to be underreported for adults and overreported for children, and overweight females appear to have higher levels of underreporting than other subgroups. The following is a summary of the key empirical findings:

- ***Most adolescent and adult subgroups have inadequate intakes of micronutrients.*** All eight key micronutrients examined—vitamin C, vitamin E, folate, calcium, magnesium, vitamin A, iron, and zinc—have moderate to high proportions with inadequate usual intakes for male and female subgroups 14 years and older.

  - Magnesium, folate and vitamin E have very high proportions with inadequate intake. Estimates of the prevalence of inadequacy for these nutrients typically exceed 70 percent for the adult subgroups and are 90 percent or higher for adolescent females.
  - Although the adequacy of calcium intake cannot be determined, mean intakes of calcium are far below the AI.
  - The prevalence of inadequate iron intake is lower than for other micronutrients, yet some subgroups—adolescent females and women in the reproductive years—have substantial proportions (10 to 20 percent) not meeting iron requirements.
  - The prevalence of inadequate intakes is typically higher for low-income subgroups relative to higher-income subgroups, and for some (but not all) overweight subgroups relative to their non-overweight counterparts.

- ***Reported energy intakes are less than estimated energy requirements for most adolescent and adult subgroups.*** Mean usual intake of food energy is less than mean Estimated Energy Requirement (EER) for the vast majority of the adolescent and adult subgroups. The difference is so large that underreporting of foods consumed must be at least a partial explanation.

  - The difference between mean EER and mean energy intake is greater for the overweight subgroups, especially female overweight subgroups, suggesting that underreporting may be associated with being overweight.
  - The difference between mean EER and mean energy intake is less for male subgroups than for female subgroups. Some male subgroups—non-overweight males 19 to 50 years of age, for example—have mean energy intake close to mean EER.

- ***For almost all adult subgroups, high proportions have usual intakes of fat outside the AMDR.*** Of those with usual fat intakes outside the AMDR, most exceed the upper bound of the AMDR. More than a third of most adult subgroups have usual intakes of fat greater than 35 percent of food energy.

- ***Dietary fiber intakes of all subgroups are low.*** For every subgroup examined, mean intake of dietary fiber is less than the AI for total fiber. Even the 90th percentile of dietary fiber intake is less than the AI for total fiber, suggesting inadequate intake of total fiber.

- ***The nutrient adequacy of diets deteriorates as individuals age.*** Children 1 to 3 years have the most nutritionally adequate diets, and children 4 to 8 years and 9 to 13 years have more nutritionally adequate diets than the older subgroups.

- The prevalence of inadequate usual intake for micronutrients is less for children than for adolescents and adults, and differences by income and overweight status are less.
- In contrast to adults, children 1 to 3 years and 4 to 8 years have reported energy intakes that *exceed* energy requirements. At least part of this difference may be the result of overreporting of intakes by parents of young children, a finding reported in other studies of intakes of infants and toddlers (Devaney 2004).
- Similar to adults, a high proportion of children 4 to 8 years and 9 to 13 years have usual fat intakes exceeding the upper limit of the AMDR. In contrast, high proportions of very young children 1 to 3 years have usual fat intakes less than the lower bound of the AMDR, partly reflecting the difference in the AMDR by age.

B. DETAILED ANALYSIS RESULTS

Adolescent Females. Adolescent females have low intakes of all micronutrients examined. The prevalence of inadequacy—percentage with usual intake less than requirements—is high, ranging from 18.7 percent for zinc to more than 90 percent for vitamin E, folate, and magnesium (Table 4a). The prevalence of inadequate vitamin E intake is almost 100 percent. Although the prevalence of inadequate calcium intake cannot be estimated precisely, mean calcium intake is far below the AI, suggesting low calcium intakes for adolescent females.

Table 4a

Usual Nutrient Intake: Micronutrients, Adolescent Females

	Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
Vitamin C (mg/d)	39	56	81	91	115	155	56	28.9
Vitamin E (mg/d)	5	6	7	7	8	9	12	99.5
Folate (mcg/d)	130	163	208	218	262	320	330	91.6
Calcium (mg/d)	434	551	704	732	882	1,065	**1,300**	…
Magnesium (mg/d)	151	180	215	220	253	295	300	90.1
Vitamin A (mcg RAE)	286	389	539	593	737	966	485	41.3
Iron (mg/d)	8.7	10.6	12.9	13.6	15.8	19.3	7.9	12.3
Zinc (mg/d)	6.4	7.8	9.6	9.9	11.6	13.8	7.3	18.7

Source: 1994-1996 CSFII.
[a]EAR = Estimated Average Requirement. For vitamin C, the EAR is 35 mg/d higher for smokers. For calcium, the value is an AI = adequate intake.
[b]For most nutrients, the % Inadequate = % with usual intakes < EAR. For iron, the probability approach is used to estimate the % Inadequate.

Both the mean and median of usual energy intake of adolescent females, as well as the estimated percentiles of the usual energy intake distributions, are less than the comparable percentiles of the EER distributions (Table 4b). Of particular importance in assessing energy intakes is that mean energy intake of 1901 kilocalories (kcal) is approximately 200 kcal less than the mean EER. This difference between mean usual intake and mean energy requirement is most likely the result of underreporting of foods consumed, since a deficit of 200 kcal per day over a period of time would lead to weight loss of approximately 10 pounds per year (Butte and Ellis 2003). Recent studies document that not only is this not the case, but that, in fact, increasing proportions of adolescent females, as well as many subgroups, are overweight (Ogden et al. 2002). Weight gain, not weight loss, is the observed problem.

Table 4b

Estimated Energy Requirements And Usual Intake Of Food Energy: Adolescent Females

	Distribution Percentiles (kcal)					
	10th	25th	Median	Mean	75th	90th
Usual intake	1,365	1,594	1,872	1,901	2,177	2,473
EER[a]	1,833	1,943	2,077	2,107	2,214	2,407

Source: 1994-1996 CSFII

[a]EER = Estimated Energy Requirement.

The usual intake of macronutrients shows that a high percentage of adolescent females has usual intake of fat that falls outside the AMDR of 25 to 35 percent of food energy (Table 4c). Almost one third of female adolescents have usual fat intakes as a percent of food energy outside the AMDR—slightly more than one quarter have usual fat intakes greater than 35 percent of food energy and 5 percent have usual fat intakes as a percent of food energy less than 25 percent. The percentage outside the AMDR for carbohydrate and protein is low, and the prevalence of inadequate intake of carbohydrate and protein intake is also low.

Table 4c

Usual Nutrient Intake: Macronutrients, Adolescent Females

	Fat		Carbohydrate		Protein	
	% < AMDR[a]	%> AMDR	% Inadeq[b]	% < AMDR	% Inadeq	% outside AMDR
Females 14-18	4.8	25.9	< 1	3.4	5.5	< 1

Source: 1994-1996 CSFII.
[a]AMDR = Acceptable Macronutrient Distribution Range.
[b]% Inadequate = % with usual intakes < EAR (Estimated Average Requirement)

Usual intakes of dietary fiber for adolescent females are far below the AI set for total fiber (Table 4d). Mean usual dietary fiber intake is 13 grams per day, compared with an AI for total fiber of 26 grams. Even if the average difference between total and dietary fiber (5.1 grams) is added to usual intakes, mean intake will still be below the AI.

Table 4d

Usual Intake of Dietary Fiber: Adolescent Females

		Usual Intake Distributions (g/d)					
	AI[a]	10th	25th	Median	Mean	75th	90th
Females 14-18	26	9	10	12	13	15	17

Source: 1994-1999 CSFII.
[a]AI = Adequate Intake.

Older Adults. With the exception of iron and vitamin B_{12}, each of the four subgroups of older adults shows a high prevalence of inadequacy of the micronutrients examined (Table 5a). For vitamin E, more than 90 percent of older women and more than three-quarters of older men had usual intakes less than their requirement. Magnesium and folate intakes also indicate a high prevalence of inadequacy, ranging from about 70 to 85 percent. The prevalence of inadequacy is lower for vitamin C, vitamin A, and zinc, though a substantial proportion (from 21 to 43 percent)

Table 5a
Usual Nutrient Intake: Micronutrients, Older Adults

	Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
				Vitamin C (mg/d)				
Males 60-70	38	59	91	104	135	186	75	42.7
Males 71+	32	53	88	102	135	190	75	42.8
Females 60-70	36	55	84	95	123	167	60	35.0
Females 71+	37	56	85	93	121	161	60	31.5
				Vitamin E (mg/d)				
Males 60-70	5	7	9	9	12	15	12	78.2
Males 71+	4	6	8	9	10	14	12	83.2
Females 60-70	4	5	6	7	8	11	12	94.7
Females 71+	3	4	6	6	8	10	12	95.3
				Folate (mcg/d)				
Males 60-70	158	205	269	290	351	448	320	67.1
Males 71+	140	189	260	283	352	456	320	67.6
Females 60-70	125	161	210	222	270	336	320	87.4
Females 71+	122	161	215	230	283	357	320	83.9
				Calcium (mg/d)				
Males 60-70	435	568	750	794	971	1,210	**1,200**	…
Males 71+	398	526	700	741	911	1,137	**1,200**	…
Females 60-70	314	423	570	604	748	936	**1,200**	…
Females 71+	311	413	550	580	714	888	**1,200**	…
				Magnesium (mg/d)				
Males 60-70	196	242	300	311	368	440	350	69.5
Males 71+	171	215	270	281	334	405	350	79.5
Females 60-70	149	184	226	232	273	323	265	71.6
Females 71+	136	171	216	222	267	318	265	74.4
				Vitamin A (mcg RAE)				
Males 60-70	418	589	869	1,017	1,263	1,784	625	28.3
Males 71+	368	548	823	987	1,228	1,786	625	32.2
Females 60-70	309	434	631	726	905	1,245	500	33.7
Females 71+	349	488	709	828	1,024	1,445	500	26.3
				Iron (mg/d)				
Males 60-70	10.5	13.1	16.3	17.3	20.4	25.3	6.0	<1
Males 71+	8.8	11.5	15.1	16.4	19.9	25.5	6.0	2.4
Females 60-70	7.5	9.4	11.8	12.4	14.8	18.1	5.0	2.8
Females 71+	7.1	9.1	11.7	12.4	14.9	18.5	5.0	3.2
				Zinc (mg/d)				
Males 60-70	7.9	9.6	11.8	12.3	14.4	17.4	9.4	22.5
Males 71+	6.7	8.3	10.6	11.3	13.6	16.7	9.4	37.2
Females 60-70	5.4	6.6	8.2	8.5	10.0	12.1	6.8	27.5
Females 71+	5.2	6.4	8.0	8.3	9.8	11.9	6.8	30.6
				Vitamin B12 (mcg/d)				
Males 60-70	2.3	3.3	5.2	7.1	8.3	13.6	2.0	2.5
Males 71+	2.2	3.1	4.6	5.9	7.1	10.5	2.0	4.7
Females 60-70	1.5	2.3	3.5	4.5	5.5	8.4	2.0	12.5
Females 71+	1.5	2.0	3.4	4.9	5.6	9.5	2.0	20.4

Source: 1994-1996 CSFII.

[a]EAR = Estimated Average Requirement. For vitamin C, the EAR is 35 mg/d higher for smokers. For calcium, the value is an AI = Adequate Intake.

[b]For most nutrients, the % Inadequate = % < EAR. For iron, the probability approach is used to estimate the % Inadequate.

still has usual intakes less than requirements. For vitamin B_{12}—a nutrient of concern among older adults—the prevalence of inadequacy is low for males (3 to 5 percent) and higher for females (13 to 20 percent). The prevalence of inadequacy for iron is low for all subgroups of older adults.

As with adolescent females, both the mean and median of usual energy intake of older adults, as well as the estimated percentiles of the usual energy intake distributions, are considerably less than the comparable percentiles of the EER distributions (Table 5b). Mean energy intakes are about 20 percent lower (about 500 kcal) than estimated EERs for older adult males and about 25 percent lower than estimated EERs for older adult females. This difference between mean usual intake and mean EER is even larger than for other subgroups examined and is most likely the result of either underreporting of foods consumed, since a deficit of 400-500 kcal per day over a period of time would lead to unsustainable weight losses. As with almost all U.S. population subgroups, the prevalence of overweight and obesity has increased for older results over the past four decades (Flegal et al. 2002; and Kuczmarski et al. 1994).

Table 5b

Estimated Energy Requirements And Usual Intake Of Food Energy: Older Adults

	Distribution Percentiles (kcal)					
	10th	25th	Median	Mean	75th	90th
Males 60-70						
Usual intake	1,397	1,681	2,018	2,066	2,397	2,794
EER[a]	2,136	2,328	2,540	2,544	2,767	2,962
Males 71+						
Usual intake	1,176	1,440	1,773	1,821	2,150	2,527
EER	1,899	2,118	2,336	2,330	2,556	2,738
Females 60-70						
Usual intake	1,022	1,218	1,451	1,481	1,710	1,979
EER	1,658	1,806	1,989	1,997	2,168	2,345
Females 71+						
Usual intake	952	1,134	1,356	1,381	1,602	1,842
EER	1,481	1,640	1,814	1,827	1,996	2,162

Source: 1994-1996 CSFII

[a]EER = Estimated Energy Requirement.

The usual intake of macronutrients shows a substantial proportion of older adults have usual intakes of fat and carbohydrate that fall outside the AMDRs (Table 5c). About one third of older females and about 40 percent of older males have usual fat intakes that exceed the upper value of the AMDR. In addition, the percent with usual intake less than the AMDR for carbohydrate is also high—12 to 16 percent of older females and between one fifth and one quarter of older males. The percent outside the AMDR for protein is low (less than 1 percent), though the prevalence of inadequate protein intake is about 20 percent for older females and 8 to 16 percent for older males.

Table 5c

Usual Nutrient Intake: Macronutrients, Older Adults

	Fat		Carbohydrate		Protein	
	% < AMDR[a]	% > AMDR	% Inadeq[b]	% < AMDR	% Inadeq	% outside AMDR
Males 60-70	1.4	40.5	< 1	26.2	8.0	< 1
Males 71+	1.5	36.6	1.6	20.6	15.6	< 1
Females 60-70	1.6	31.1	3.5	16.0	18.2	< 1
Females 71+	2.3	28.3	4.3	11.6	20.4	< 1

Source: 1994-1996 CSFII.
[a]AMDR = Acceptable Macronutrient Distribution Range.
[b]% Inadequate = % with usual intakes < EAR (Estimated Average Requirement).

For older adults, usual intakes of dietary fiber are far below the AI set for total fiber (Table 5d). Mean usual dietary fiber intake is 19 and 18 grams per day for older males ages 60 to 70 and 71 and older, respectively, compared with an AI for total fiber of 30 grams. For older females, mean dietary fiber intake is 14 grams, compared with an AI of 21 grams. For both older males and females, the 90th percentile of usual dietary fiber intake is less than or close to the AI.

Table 5d

Usual Intake of Dietary Fiber: Older Adults

	Usual Intake Distributions (g/d)						
	AI[a]	10th	25th	Median	Mean	75th	90th
Males 60-70	30	10	13	18	19	23	28
Males 71+	30	9	12	17	18	22	27
Females 60-70	21	8	11	14	14	18	22
Females 71+	21	8	10	14	14	17	21

Source: 1994-1999 CSFII.
[a]AI = Adequate Intake.

Overweight Individuals.[1] Overall, the adequacy of micronutrient intake does not differ by overweight status (Table 6a). For adolescents and adults, the prevalence of inadequate usual intakes of vitamin C, vitamin E, folate, magnesium, and vitamin A is generally high for both overweight and non-overweight individuals and for both male and female subgroups. There is a low prevalence of inadequacy for iron, while for zinc, the prevalence of inadequacy is low among children but increases with age.

Most differences between overweight and non-overweight subgroups in the percentage with inadequate intakes are small, with the following exceptions:

- Adolescent overweight males have a higher prevalence of inadequate vitamin C intakes than adolescent non-overweight males (34 percent versus 21 percent). The opposite pattern is observed for vitamin C intakes for the adolescent female subgroups (17 percent versus 29 percent).
- For folate, overweight children aged 9 to 13 years, overweight adolescent females, and overweight females aged 19 to 50 years have a higher prevalence of inadequate intakes compared with comparable age and gender groups who are not overweight.

[1] Overweight for children and adolescents means at risk of overweight and is defined as BMI greater than the 85th percentile for children up through age 20. For adults over 20 years of age, overweight is defined as BMI greater than 25.

Table 6a

Usual Nutrient Intake: Micronutrients, Overweight Status

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
	Vitamin C (mg/d)								**Vitamin E (mg/d)**							
Kids 4 - 8, overweight	50	69	96	103	129	165	22	0.4	4	5	6	6	7	9	6	52.3
Kids 4 - 8, not overweight	48	65	90	97	121	154	22	0.4	4	5	6	6	7	9	6	49.6
Kids 9 - 13, overweight	44	61	84	91	114	147	39	6.6	5	6	7	7	8	10	9	83.5
Kids 9 - 13, not overweight	48	67	95	105	132	174	39	5.1	5	6	7	8	9	11	9	72.8
Males 14 - 18, overweight	35	55	86	102	132	187	63	33.8	6	7	9	9	11	13	12	83.7
Males 14 - 18, not overweight	51	74	109	124	158	216	63	20.7 *	6	7	9	9	11	13	12	85.1
Males 19 - 30, overweight	44	64	94	107	136	185	75	33.2	6	8	10	10	12	15	12	73.4
Males 19 - 30, not overweight	47	71	110	128	164	232	75	40.6	6	8	10	10	12	15	12	74.4
Males 31 - 50, overweight	37	57	90	104	136	190	75	45.8	7	8	10	10	12	15	12	73.9
Males 31 - 50, not overweight	43	64	96	108	138	188	75	43.2	6	8	10	11	s	16	12	70.4
Males 51 - 70, overweight	38	59	91	104	135	188	75	42.9	5	7	9	9	11	15	12	79.1
Males 51 - 70, not overweight	39	62	99	114	149	207	75	41.6	5	7	9	9	11	15	12	79.0
Males 71+, overweight	29	50	84	98	130	184	75	45.3	4	6	8	9	11	15	12	81.1
Males 71+, not overweight	35	57	92	106	139	194	75	39.9	4	6	7	8	10	13	12	87.0
Females 14 - 18, overweight	57	65	75	76	86	97	56	16.9	4	5	7	7	8	10	12	96.0
Females 14 - 18, not overweight	37	55	83	95	121	168	56	29.4 *	6	6	7	7	8	8	12	100.0
Females 19 - 30, overweight	45	61	84	91	114	147	60	36.4	5	6	7	7	8	9	12	99.8
Females 19 - 30, not overweight	38	55	81	90	115	154	60	34.9	4	6	7	8	9	11	12	93.1
Females 31 - 50, overweight	36	52	76	85	109	147	60	42.6	4	5	7	7	9	11	12	93.2
Females 31 - 50, not overweight	32	49	76	88	113	158	60	43.6	4	6	7	7	9	11	12	93.6
Females 51 - 70, overweight	38	56	83	93	120	162	60	34.3	4	5	7	7	8	10	12	95.6
Females 51 - 70, not overweight	35	55	86	96	125	170	60	36.7	4	5	7	7	8	11	12	95.1
Females 71+, overweight	43	62	88	96	122	158	60	25.8	4	5	6	6	8	10	12	96.7
Females 71+, not overweight	35	54	82	91	118	158	60	34.5	3	4	6	6	8	10	12	95.9
	Folate (mcg/d)								**Calcium (mg/d)**							
Kids 4 - 8, overweight	163	205	259	271	323	393	160	9.2	551	686	851	872	1,034	1,219	**800**	…
Kids 4 - 8, not overweight	161	205	262	272	326	395	160	9.6	582	711	874	896	1,057	1,240	**800**	…
Kids 9 - 13, overweight	149	187	239	251	301	369	250	55.3	633	751	898	917	1,062	1,225	**1,300**	…
Kids 9 - 13, not overweight	173	215	271	285	340	414	250	40.6 **	598	747	941	975	1,166	1,397	**1,300**	…
Males 14 - 18, overweight	162	204	263	281	338	422	330	73.0	641	830	1,093	1,168	1,424	1,790	**1,300**	…
Males 14 - 18, not overweight	170	226	306	329	406	519	330	57.1	645	841	1,108	1,175	1,436	1,790	**1,300**	…
Males 19 - 30, overweight	175	225	294	314	382	479	320	58.5	572	729	940	988	1,195	1,466	**1,000**	…
Males 19 - 30, not overweight	176	224	294	321	390	501	320	57.9	556	716	937	997	1,515	1,725	**1,000**	…
Males 31 - 50, overweight	162	209	274	294	357	450	320	65.1	469	626	850	922	1,139	1,467	**1,000**	…

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
Males 31 - 50, not overweight	171	223	293	318	384	494	320	58.7	518	665	862	906	1,099	1,350	**1,000**	…
Males 51 - 70, overweight	156	203	267	289	349	447	320	67.6	435	567	748	794	971	1,212	**1,200**	…
Males 51 - 70, not overweight	156	206	275	293	361	455	320	64.6	402	539	728	776	961	1,213	**1,200**	…
Males 71+, overweight	138	187	256	278	345	445	320	69.1	373	502	683	733	909	1,158	**1,200**	…
Males 71+, not overweight	143	194	265	287	356	458	320	66.5	428	551	715	748	908	1,110	**1,200**	
Females 14 - 18, overweight	157	180	207	211	238	270	330	98.9	461	552	665	681	793	920	**1,300**	…
Females 14 - 18, not overweight	126	161	208	220	266	328	330	90.3 *	443	564	721	749	904	1,091	**1,300**	…
Females 19 - 30, overweight	135	164	202	209	246	292	320	94.7	376	480	617	644	779	948	**1,000**	…
Females 19 - 30, not overweight	129	168	222	236	289	362	320	82.8 **	408	523	677	707	858	1,046	**1,000**	…
Females 31 - 50, overweight	122	156	202	214	259	322	320	89.7	339	449	597	631	776	967	**1,000**	…
Females 31 - 50, not overweight	119	160	217	234	290	370	320	82.0 **	379	492	642	674	821	1,010	**1,000**	…
Females 51 - 70, overweight	123	158	203	217	261	327	320	89.0	322	428	570	601	740	919	**1,200**	…
Females 51 - 70, not overweight	126	163	215	229	279	351	320	85.0	352	453	589	621	755	932	**1,200**	…
Females 71+, overweight	122	159	210	223	273	341	320	86.6	296	393	527	564	695	879	**1,200**	…
Females 71+, not overweight	130	169	223	236	288	358	320	83.2	343	443	571	592	719	868	**1,200**	…
				Magnesium (mg/d)								**Vitamin A (mcg RAE)**				
Kids 4 - 8, overweight	155	182	215	220	252	290	110	0.9	419	526	667	702	838	1,027	275	1.1
Kids 4 - 8, not overweight	159	184	216	220	251	286	110	0.5	452	560	704	731	872	1,042	275	0.6
Kids 9 - 13, overweight	166	197	236	241	280	324	200	26.9	371	479	630	672	819	1,027	420	16.1
Kids 9 - 13, not overweight	178	209	246	253	289	335	200	20.0	471	592	752	788	945	1,149	420	5.7
Males 14 - 18, overweight	190	232	288	299	354	424	340	70.6	383	513	704	775	959	1,257	630	40.6
Males 14 - 18, not overweight	213	256	312	322	377	445	340	61.9	418	588	838	926	1,167	1,544	630	29.2
Males 19 - 30, overweight	214	265	329	344	405	491	330	50.4	360	493	689	762	950	1,255	625	42.1
Males 19 - 30, not overweight	196	246	313	328	394	481	330	56.2	384	510	693	758	934	1,213	625	40.8
Males 31 - 50, overweight	210	259	323	335	398	477	350	60.0	364	512	730	829	1,031	1,410	625	35.4
Males 31 - 50, not overweight	211	264	331	342	409	487	350	56.8	389	537	750	833	1,034	1,376	625	38.2
Males 51 - 70, overweight	197	244	301	311	367	438	350	69.7	389	544	791	921	1,153	1,596	625	27.6
Males 51 - 70, not overweight	189	241	307	319	385	465	350	65.0	427	597	881	995	1,263	1,682	625	33.6
Males 71+, overweight	170	213	270	282	339	410	350	78.1	377	559	850	999	1,271	1,802	625	33.7
Males 71+, not overweight	169	213	269	279	334	400	350	79.7	357	532	812	955	1,217	1,726	625	30.9
Females 14 - 18, overweight	142	166	197	202	231	267	300	96.3	367	461	587	618	741	907	485	29.7
Females 14 - 18, not overweight	151	182	219	223	260	301	300	89.7	271	374	525	578	723	952	485	43.6
Females 19 - 30, overweight	154	177	204	207	234	264	255	86.6	293	393	536	582	720	928	500	43.9
Females 19 - 30, not overweight	154	188	229	237	277	329	255	64.7 **	279	393	562	640	798	1,095	500	41.2
Females 31 - 50, overweight	148	179	218	225	262	311	265	76.1	321	428	577	628	769	994	500	37.6
Females 31 - 50, not overweight	156	195	242	250	295	352	265	62.0 **	296	415	587	653	816	1,092	500	37.1
Females 51 - 70, overweight	152	184	225	231	272	318	265	72.0	303	420	590	672	827	1,134	500	28.3
Females 51 - 70, not overweight	160	195	238	245	287	340	265	65.2	353	477	652	719	884	1,163	500	36.9
Females 71+, overweight	139	172	213	218	259	304	265	77.7	336	467	703	860	1,068	1,538	500	21.1

Table 6a

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
Females 71+, not overweight	139	174	220	227	272	325	265	72.3	407	528	713	773	950	1,205	500	29.0
				Iron (mg/d)								**Zinc (mg/d)**				
Kids 4 - 8, overweight	9.4	11.1	13.4	14.0	16.2	19.5	4.1	<1	6.6	7.9	9.5	9.9	11.5	13.5	4.0	0.2
Kids 4 - 8, not overweight	9.5	11.2	13.4	14.0	16.2	19.0	4.1	<1	6.8	7.9	9.4	9.6	11.1	12.8	4.0	0.1
Kids 9 - 13, overweight	10.5	12.5	15.0	15.5	18.0	21.0	5.9/5.7	<1	7.7	9.0	10.8	11.1	12.9	15.1	7.0	5.5
Kids 9 - 13, not overweight	10.8	13.0	15.8	16.6	19.3	23.3	5.9/5.7	<1	7.8	9.2	11.1	11.4	13.2	15.5	7.0	4.7
Males 14 - 18, overweight	12.2	14.6	17.9	18.9	22.1	26.7	7.7	<1	10.0	11.7	13.8	14.2	16.3	18.9	8.5	2.7
Males 14 - 18, not overweight	12.7	15.6	19.4	20.5	24.2	29.6	7.7	<1	10.1	11.9	14.3	14.7	17.0	19.9	8.5	2.7
Males 19 - 30, overweight	12.7	15.3	18.4	19.3	22.3	26.9	6.0	<1	10.2	12.3	14.8	15.3	17.9	21.3	9.4	6.3
Males 19 - 30, not overweight	12.5	15.1	18.4	19.6	22.9	28.1	6.0	<1	9.3	11.3	13.9	14.5	17.0	20.6	9.4	10.7
Males 31 - 50, overweight	11.7	14.3	17.7	18.8	22.0	27.3	6.0	<1	9.1	11.1	13.7	14.4	16.9	20.3	9.4	11.9
Males 31 - 50, not overweight	11.6	14.2	18.0	19.3	23.0	28.7	6.0	<1	9.2	11.2	13.8	14.6	17.1	20.8	9.4	11.1
Males 51 - 70, overweight	10.5	12.9	16.1	17.2	20.2	25.2	6.0	<1	8.3	10.0	12.3	12.9	15.1	18.1	9.4	19.2
Males 51 - 70, not overweight	10.0	12.6	16.3	17.2	20.8	25.6	6.0	1.2	7.4	9.4	11.9	12.6	14.8	18.4	9.4	24.7
Males 71+, overweight	8.9	11.5	15.2	16.4	20.0	25.3	6.0	2.1	7.0	8.7	10.8	11.5	13.5	16.8	9.4	33.2
Males 71+, not overweight	8.5	11.2	15.0	16.3	20.0	25.7	6.0	3.2	6.5	8.3	10.5	11.1	13.2	16.5	9.4	37.7
Females 14 - 18, overweight	8.9	10.5	12.5	13.1	15.0	17.9	7.9	10.9	6.8	8.1	9.8	10.1	11.8	13.9	7.3	15.2
Females 14 - 18, not overweight	8.8	10.7	13.1	13.6	15.9	19.2	7.9	12.2	6.5	7.8	9.5	9.7	11.4	13.2	7.3	17.9
Females 19 - 30, overweight	8.9	10.4	12.3	12.6	14.5	16.7	8.1	15.2	6.5	7.6	8.9	9.1	10.4	11.9	6.8	13.3
Females 19 - 30, not overweight	8.4	10.3	12.9	13.6	16.1	19.8	8.1	15.7	6.4	7.6	9.2	9.6	11.2	13.2	6.8	14.2
Females 31 - 50, overweight	8.0	9.7	12.0	12.6	14.7	17.9	8.1	18.9	6.2	7.4	9.0	9.3	10.8	12.7	6.8	16.1
Females 31 - 50, not overweight	7.9	10.1	12.7	13.6	16.1	20.1	8.1	17.2	5.8	7.2	9.1	9.7	11.6	14.3	6.8	20.2
Females 51 - 70, overweight	7.7	9.4	11.6	12.2	14.3	17.4	5.0	2.2	5.7	6.9	8.3	8.6	10.0	11.9	6.8	23.6
Females 51 - 70, not overweight	8.0	9.8	12.2	12.8	15.1	18.3	5.0	1.5	5.9	7.0	8.4	8.7	10.1	11.9	6.8	21.9
Females 71+, overweight	7.4	9.2	11.6	12.2	14.5	17.6	5.0	2.7	5.7	6.8	8.2	8.4	9.8	11.5	6.8	25.5
Females 71+, not overweight	7.2	9.1	11.8	12.6	15.2	18.9	5.0	2.9	4.8	6.1	7.7	8.2	9.7	12.1	6.8	35.5

Source: 1994-1996, 1998 CSFII.

[a]EAR = Estimated Average Requirement. For Vitamin C, the EAR is 35 mg/d higher for smokers. For calcium, the value is an AI = Adequate Intake.

[b]For most nutrients, the % Inadequate = % < EAR. For iron, the probability approach is used to estimate the % Inadequate.

*(**): p-value for difference between overweight and non-overweight is < 0.05(0.01)

Table 6a

- Mean calcium intakes of overweight females are consistently less than mean calcium intakes of non-overweight females, although the differences are not statistically significant.
- For magnesium, overweight females generally have a higher prevalence of inadequacy than non-overweight females.

As observed for the adolescent and older adult subgroups, both the mean and median of usual energy intake of the adult subgroups, as well as the estimated percentiles of the usual energy intake distributions, are less than the comparable percentiles of the EER distributions (Table 6b). The difference between mean energy intake and mean EER is greater for the overweight subgroups, especially female overweight subgroups, a finding reported in previous studies (Briefel et al. 1997, 1995). For overweight females, mean energy intakes are about 40 percent lower (550 to 700 kcal) than mean EER for all age subgroups. As before, this difference between mean usual intake and mean EER is most likely the result of underreporting of foods consumed, since the reported deficit in energy intake is inconsistent with both overweight status and the increasing prevalence of overweight and obesity.

For the non-overweight subgroups, the difference between energy requirements and mean energy intakes is much less (Table 6b). In fact, for non-overweight adolescent males and adult males 19 to 50 years of age, mean energy intake and mean EERs are close in value.

For overweight and non-overweight children 4 to 8 years of age, mean energy intakes *exceed* mean EERs (Table 6b). Although the excess consumption of energy relative to energy requirements is consistent with the increasing prevalence of overweight and obesity, the magnitude of the difference—more than 200 kcal—would imply a weight gain in excess of what has been observed. For example, an excess of 200 kcal per day over a period of time implies a weight gain of approximately 10 pounds per year (Butte and Ellis 2003), which appears large even in the context of the increasing prevalence of overweight among children.

Table 6b

Estimated Energy Requirements and Usual Intake of Food Energy: Overweight Status

	Distribution Percentiles (kcal)							Distribution Percentiles (kcal)						
	10th	25th	Median	Mean	75th	90th		10th	25th	Median	Mean	75th	90th
Kids 4 - 8, overweight							Kids 4 - 8, not overweight						
Usual intake	1,358	1,556	1,786	1,823	2,053	2,337	Usual intake	1,364	1,542	1,751	1,772	1,979	2,207
EER[a]	1,226	1,344	1,531	1,563	1,759	1,945	EER	1,301	1,411	1,533	1,548	1,658	1,822
Kids 9 - 13, overweight							Kids 9 - 13, not overweight						
Usual intake	1,444	1,703	2,027	2,073	2,394	2,763	Usual intake	1,559	1,792	2,070	2,113	2,385	2,719
EER	1,696	1,875	2,165	2,237	2,529	2,887	EER	1,608	1,770	1,942	1,982	2,153	2,402
Males 14 - 18, overweight							Males 14 - 18, not overweight						
Usual intake	1,833	2,168	2,614	2,716	3,151	3,730	Usual intake	1,930	2,306	2,786	2,865	3,338	3,903
EER	2,857	3,089	3,282	3,343	3,582	3,937	EER	2,375	2,595	2,816	2,815	3,070	3,249
Males 19 - 30, overweight							Males 19 - 30, not overweight						
Usual intake	1,852	2,231	2,711	2,784	3,258	3,812	Usual intake	1,843	2,242	2,735	2,858	3,331	4,020
EER	2,702	2,828	3,044	3,071	3,254	3,531	EER	2,401	2,571	2,786	2,759	2,954	3,083
Males 31 - 50, overweight							Males 31 - 50, not overweight						
Usual intake	1,700	2,045	2,494	2,579	3,019	3,566	Usual intake	1,709	2,049	2,444	2,504	2,889	3,373
EER	2,519	2,702	2,886	2,909	3,107	3,311	EER	2,268	2,411	2,607	2,618	2,812	2,985
Males 51 - 70, overweight							Males 51 - 70, not overweight						
Usual intake	1,459	1,747	2,103	2,148	2,501	2,895	Usual intake	1,393	1,713	2,120	2,184	2,586	3,058
EER	2,333	2,521	2,719	2,728	2,917	3,134	EER	2,027	2,214	2,410	2,411	2,612	2,799
Males 71+, overweight							Males 71+, not overweight						
Usual intake	1,178	1,435	1,771	1,836	2,167	2,579	Usual intake	1,193	1,456	1,775	1,805	2,121	2,455
EER	2,102	2,271	2,481	2,473	2,689	2,825	EER	1,836	2,017	2,186	2,191	2,380	2,521
Females 14 - 18, overweight							Females 14 - 18, not overweight						
Usual intake	1,277	1,482	1,729	1,751	1,996	2,254	Usual intake	1,421	1,662	1,922	1,948 *	2,203	2,504
EER	2,124	2,232	2,371	2,416	2,546	2,755	EER	1,806	1,904	2,025	2,024	2,137	2,223
Females 19 - 30, overweight							Females 19 - 30, not overweight						
Usual intake	1,244	1,469	1,750	1,789	2,067	2,384	Usual intake	1,308	1,545	1,829	1,854	2,136	2,431
EER	2,137	2,270	2,502	2,495	2,642	2,877	EER	1,859	1,970	2,090	2,101	2,233	2,343
Females 31 - 50, overweight							Females 31 - 50, not overweight						
Usual intake	1,174	1,395	1,657	1,696	1,953	2,265	Usual intake	1,181	1,410	1,677	1,715	1,980	2,297
EER	2,028	2,170	2,352	2,379	2,538	2,746	EER	1,755	1,871	2,012	2,010	2,160	2,258
Females 51 - 70, overweight							Females 51 - 70, not overweight						
Usual intake	1,039	1,247	1,502	1,532	1,785	2,063	Usual intake	1,098	1,281	1,507	1,533	1,757	2,003
EER	1,859	2,005	2,156	2,177	2,334	2,499	EER	1,609	1,727	1,870	1,872	2,010	2,146
Females 71+, overweight							Females 71+, not overweight						
Usual intake	973	1,161	1,386	1,405	1,629	1,861	Usual intake	964	1,129	1,332	1,356	1,557	1,780
EER	1,665	1,781	1,968	1,958	2,112	2,264	EER	1,426	1,540	1,711	1,696	1,857	1,957

Source: 1994-1996, 1998 CSFII.

[a]EER = Estimated Energy Requirement.

*: p-value for difference in mean intakes between overweight and non-overweight is < 0.05

The intake of macronutrients shows high percentages with usual intakes of fat and carbohydrate that fall outside the AMDRs (Table 6c). The percentage with usual fat intakes exceeding the upper bound of the AMDR is higher for overweight individuals than for non-overweight individuals in most age-gender groups. For carbohydrate, the percentage with usual intake below the lower bound of the AMDR does not differ much between overweight and non-overweight females, but is larger for overweight children and adult males than for non-overweight children and adult males. The percent outside the AMDR for protein is low (less than 1 percent), although the prevalence of inadequate protein intake is between 20 and 30 percent for the overweight adult female subgroups. For almost all age and gender subgroups, the percentage with inadequate usual intake is significantly higher for overweight than for non-overweight individuals, presumably reflecting the higher protein requirements for overweight individuals.

Usual intakes of dietary fiber for both the overweight and non-overweight subgroups are far below the AI set for total fiber (Table 6d). For all subgroups, mean usual dietary fiber intake is considerably less than the AI. For most subgroups, even the 90th percentile of usual dietary fiber intake is less than the AI.

Low-Income Individuals. As shown for other subgroups, the prevalence of inadequate usual intakes of folate, magnesium, vitamin A, and zinc for adolescent and adult subgroups is generally high for both low-income and higher-income individuals (Table 7a). However, the prevalence of inadequate intakes for these nutrients is usually higher for low-income subgroups, especially for low-income elderly subgroups compared with higher-income elderly subgroups. For calcium, a similar pattern is observed; mean usual intake of calcium for low-income age and gender subgroups is less than the mean usual intake for the higher-income age and gender

Table 6c
Usual Nutrient Intake: Macronutrients, Overweight Status

	Fat		Carbohydrate		Protein	
	% < AMDR[a]	% > AMDR	% Inadeq	% < AMDR	% Inadeq	% outside AMDR
Kids 4 - 8, overweight	1.4	25.0	<1	2.0	<1	<1
Kids 4 - 8, not overweight	2.0	19.5	<1	<1 *	<1	<1
Kids 9 - 13, overweight	<1	28.6	<1	1.9	4.6	<1
Kids 9 - 13, not overweight	<1	22.2	<1	<1	<1 **	<1
Males 14 - 18, overweight	<1	38.9	<1	8.4	13.3	<1
Males 14 - 18, not overweight	2.9	26.3	<1	<1 *	<1 **	<1
Males 19 - 30, overweight	<1	25.3	<1	21.8	4.4	<1
Males 19 - 30, not overweight	<1	27.3	<1	15.5	1.1 **	<1
Males 31 - 50, overweight	<1	42.4	<1	29.6	4.8	<1
Males 31 - 50, not overweight	<1	32.3 **	<1	19.3 **	1.1 **	<1
Males 51 - 70, overweight	<1	44.2	<1	31.7	9.9	<1
Males 51 - 70, not overweight	2.1	34.6 **	1.1	22.8 **	3.7 **	<1
Males 71+, overweight	<1	40.3	1.6	21.9	21.7	<1
Males 71+, not overweight	2.9	33.2	1.3	18.5	9.0 **	<1
Females 14 - 18, overweight	3.3	42.4	<1	4.4	19.3	<1
Females 14 - 18, not overweight	5.2	21.8 *	<1	2.6	2.7 *	1.1
Females 19 - 30, overweight	<1	35.9	<1	12.8	26.3	2.4
Females 19 - 30, not overweight	1.7	25.2	<1	10.3	3.0 **	2.0
Females 31 - 50, overweight	<1	38.5	1.7	18.6	23.9	<1
Females 31 - 50, not overweight	1.7	31.8 *	2.3	16.1	5.4 **	<1
Females 51 - 70, overweight	1.2	36.6	3.0	19.0	27.3	<1
Females 51 - 70, not overweight	2.7	25.4 **	2.0	15.0	4.1 **	<1
Females 71+, overweight	<1	30.1	4.1	11.2	30.1	<1
Females 71+, not overweight	3.9 **	25.4	2.8	9.4	11.0 **	<1

Source: 1994-1996, 1998 CSFII.

[a]AMDR = Acceptable Macronutrient Distribution Range.

[b]% Inadequate = % < EAR (Estimated Average Requirement).

*(**): p-value for difference between overweight and non-overweight is < .05(0.01)

Table 6d
Usual Intake of Dietary Fiber: Overweight Status

		Usual Intake Distributions (g/d)					
	AI[a]	10th	25th	Median	Mean	75th	90th
Kids 4 - 8, overweight	25	8	10	12	12	14	17
Kids 4 - 8, not overweight	25	9	10	12	12	14	16
Kids 9 - 13, overweight	31/26	9	11	13	14	16	19
Kids 9 - 13, not overweight	31/26	10	11	14	14	16	19
Males 14 - 18, overweight	38	10	13	16	17	20	24
Males 14 - 18, not overweight	38	12	14	17	18	21	25
Males 19 - 30, overweight	38	10	13	18	18	23	28
Males 19 - 30, not overweight	38	10	13	17	19	23	29
Males 31 - 50, overweight	38	11	14	18	19	22	27
Males 31 - 50, not overweight	38	11	14	19	20	24	29
Males 51 - 70, overweight	30	10	13	18	18	23	28
Males 51 - 70, not overweight	30	10	13	18	19	23	29
Males 71+, overweight	30	9	12	16	17	22	27
Males 71+, not overweight	30	9	12	17	18	22	27
Females 14 - 18, overweight	26	9	11	12	12	13	15
Females 14 - 18, not overweight	26	8	10	12	13	15	18
Females 19 - 30, overweight	25	8	10	12	12	14	17
Females 19 - 30, not overweight	25	8	10	13	14 *	16	20
Females 31 - 50, overweight	25	8	10	13	13	16	19
Females 31 - 50, not overweight	25	8	10	14	15 **	18	23
Females 51 - 70, overweight	21	8	11	14	14	17	21
Females 51 - 70, not overweight	21	9	11	14	15	18	22
Females 71+, overweight	21	8	10	13	14	17	21
Females 71+, not overweight	21	8	11	14	14	18	22

Source: 1994-1996, 1998 CSFII.
[a]AI = Adequate Intake.
*(**): p-value for difference in mean intakes between overweight and non-overweight is <0.05(0.01)

Table 7a

Usual Nutrient Intake: Micronutrients, Low-Income Individuals

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
	Vitamin C (mg/d)								**Vitamin E (mg/d)**							
Kids 4 - 8, LE 185% FPL[b]	50	68	94	101	126	161	22	< 1	4	5	6	6	7	9	6	48.2
Kids 4 - 8, GT 185% FPL	50	67	92	100	124	159	22	< 1	4	5	6	6	7	9	6	51.0
Kids 9 - 13, LE 185% FPL	44	61	87	95	120	157	39	6.9	5	6	7	7	8	10	9	82.7
Kids 9 - 13, GT 185% FPL	49	68	96	105	132	173	39	4.5	5	6	7	8	9	11	9	73.1
Males 14 - 18, LE 185% FPL	43	65	98	112	144	197	63	28.1	6	8	9	9	10	12	12	90.5
Males 14 - 18, GT 185% FPL	49	72	108	125	158	220	63	20.5	6	7	9	9	11	14	12	80.5
Males 19 - 30, LE 185% FPL	50	71	102	114	144	192	75	35.1	6	8	10	10	12	15	12	75.2
Males 19 - 30, GT 185% FPL	43	66	102	120	154	218	75	37.9	6	8	10	10	12	15	12	74.7
Males 31 - 50, LE 185% FPL	38	60	95	111	144	205	75	47.4	5	7	9	10	12	16	12	74.4
Males 31 - 50, GT 185% FPL	40	60	91	104	134	186	75	44.0	6	8	10	10	12	16	12	73.0
Males 51 - 70, LE 185% FPL	31	52	85	101	133	192	75	50.7	4	6	8	8	10	13	12	86.3
Males 51 - 70, GT 185% FPL	40	62	95	109	141	195	75	40.4 **	6	7	9	10	12	15	12	76.3 *
Males 71+, LE 185% FPL	26	41	65	75	98	138	75	61.2	3	4	6	6	8	10	12	95.3
Males 71+, GT 185% FPL	39	63	101	115	151	208	75	34.4 **	5	6	9	10	12	16	12	76.8 **
Females 14 - 18, LE 185% FPL	46	62	84	91	113	145	56	23.5	4	5	6	7	8	10	12	96.1
Females 14 - 18, GT 185% FPL	37	54	79	89	114	155	56	30.5	5	6	7	7	8	10	12	98.6
Females 19 - 30, LE 185% FPL	37	56	84	94	122	165	60	36.2	4	5	6	7	8	10	12	96.8
Females 19 - 30, GT 185% FPL	40	57	80	88	111	147	60	36.2	5	6	7	7	9	10	12	96.1
Females 31 - 50, LE 185% FPL	34	50	76	86	110	151	60	46.4	4	5	6	7	8	10	12	96.1
Females 31 - 50, GT 185% FPL	33	50	76	87	111	154	60	42.1	4	6	7	8	9	11	12	92.2
Females 51 - 70, LE 185% FPL	32	46	68	77	98	132	60	48.1	4	5	6	6	7	9	12	98.0
Females 51 - 70, GT 185% FPL	39	60	90	100	130	175	60	31.3 **	4	5	7	7	9	11	12	93.5
Females 71+, LE 185% FPL	36	53	78	87	111	148	60	35.9	3	4	5	5	6	8	12	98.3
Females 71+, GT 185% FPL	40	60	90	99	128	169	60	27.6	4	5	7	7	9	11	12	92.9
	Folate (mcg/d)								**Calcium (mg/d)**							
Kids 4 - 8, LE 185% FPL	165	207	265	278	334	409	160	8.7	568	691	841	863	1,010	1,184	**800**	…
Kids 4 - 8, GT 185% FPL	163	207	262	271	324	388	160	9.2	581	714	881	903 *	1,067	1,252	**800**	…
Kids 9 - 13, LE 185% FPL	156	193	243	253	302	365	250	53.6	592	713	862	886	1,032	1,209	**1,300**	…
Kids 9 - 13, GT 185% FPL	171	213	271	286	343	421	250	40.8 *	623	774	969	1,001 **	1,193	1,420	**1,300**	…
Males 14 - 18, LE 185% FPL	173	218	278	294	353	434	330	68.5	609	785	1,024	1,081	1,315	1,627	**1,300**	…
Males 14 - 18, GT 185% FPL	166	223	305	333	412	534	330	57.0	677	872	1,141	1,214	1,476	1,844	**1,300**	…
Males 19 - 30, LE 185% FPL	201	245	304	316	373	446	320	56.6	598	747	947	992	1,187	1,444	**1,000**	…
Males 19 - 30, GT 185% FPL	161	213	289	317	390	509	320	58.9	530	696	927	992	1,217	1,538	**1,000**	…
Males 31 - 50, LE 185% FPL	159	207	271	287	350	436	320	66.7	439	602	837	914	1,141	1,488	**1,000**	…
Males 31 - 50, GT 185% FPL	164	213	282	305	372	474	320	61.9	502	652	858	911	1,112	1,389	**1,000**	…
Males 51 - 70, LE 185% FPL	136	180	245	266	329	424	320	73.0	378	500	668	712	875	1,101	**1,200**	…
Males 51 - 70, GT 185% FPL	159	205	275	297	363	460	320	64.2	441	576	761	806 **	987	1,229	**1,200**	…
Males 71+, LE 185% FPL	119	160	218	237	294	379	320	80.9	323	438	599	646	803	1,028	**1,200**	…

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
Males 71+, GT 185% FPL	159	211	284	306	377	480	320	61.0 **	466	590	753	788 **	948	1,153	**1,200**	…
Females 14 - 18, LE 185% FPL	132	159	194	200	234	276	330	97.6	484	581	703	720	840	977	**1,300**	…
Females 14 - 18, GT 185% FPL	135	170	217	229	275	338	330	88.7 *	428	550	711	743	901	1,099	**1,300**	…
Females 19 - 30, LE 185% FPL	115	154	209	226	280	360	320	84.0	374	483	628	656	798	976	**1,000**	…
Females 19 - 30, GT 185% FPL	137	172	220	230	276	336	320	87.0	404	520	675	707	858	1,051	**1,000**	…
Females 31 - 50, LE 185% FPL	106	138	187	204	250	323	320	89.6	316	424	576	619	768	979	**1,000**	…
Females 31 - 50, GT 185% FPL	126	165	218	232	284	357	320	83.8	382	492	638	667	810	990	**1,000**	…
Females 51 - 70, LE 185% FPL	111	142	184	197	238	298	320	93.0	290	398	546	582	727	921	**1,200**	…
Females 51 - 70, GT 185% FPL	128	165	216	230	280	351	320	84.8 **	355	456	592	622	755	928	**1,200**	…
Females 71+, LE 185% FPL	117	151	198	212	258	324	320	89.4	298	391	512	534	653	799	**1,200**	…
Females 71+, GT 185% FPL	128	171	231	246	304	383	320	79.1 *	338	444	586	618 **	758	939	**1,200**	…
				Magnesium (mg/d)								**Vitamin A (mcg RAE)**				
Kids 4 - 8, LE 185% FPL	157	182	214	220	251	289	110	< 1	398	507	653	698	839	1,047	275	1.2
Kids 4 - 8, GT 185% FPL	159	185	218	221	254	289	110	< 1	439	553	700	732	876	1,064	275	< 1
Kids 9 - 13, LE 185% FPL	170	196	227	232	262	299	200	28.0	404	516	659	701	837	1,045	445/420	11.7
Kids 9 - 13, GT 185% FPL	179	212	252	259	299	348	200	18.7 *	449	574	743	783	949	1,168	445/420	7.5
Males 14 - 18, LE 185% FPL	202	240	290	297	346	403	340	72.8	439	571	755	809	987	1,247	630	33.0
Males 14 - 18, GT 185% FPL	206	252	314	328	388	467	340	60.0 *	411	580	833	930	1,172	1,570	630	30.0
Males 19 - 30, LE 185% FPL	212	261	324	336	398	474	330	52.2	365	474	623	661	807	1,007	625	50.4
Males 19 - 30, GT 185% FPL	199	250	315	333	397	490	330	55.3	365	507	719	825	1,020	1,406	625	39.3
Males 31 - 50, LE 185% FPL	187	241	310	328	400	495	350	62.5	286	414	636	743	954	1,322	625	48.9
Males 31 - 50, GT 185% FPL	218	266	328	339	400	475	350	58.5	410	558	771	857	1,056	1,406	625	32.9 **
Males 51 - 70, LE 185% FPL	169	215	273	285	341	415	350	77.4	355	527	783	946	1,177	1,729	625	34.6
Males 51 - 70, GT 185% FPL	202	250	310	320	378	452	350	66.0 **	422	578	824	933	1,161	1,564	625	30.0
Males 71+, LE 185% FPL	149	187	235	246	292	356	350	89.1	269	421	674	822	1,055	1,552	625	45.6
Males 71+, GT 185% FPL	187	231	288	298	355	423	350	73.6 **	456	639	919	1,046	1,309	1,787	625	23.8 **
Females 14 - 18, LE 185% FPL	166	187	212	214	239	265	300	97.9	335	419	532	558	669	814	485	39.5
Females 14 - 18, GT 185% FPL	141	173	214	221	262	310	300	87.7 *	282	390	551	613	766	1,020	485	40.1
Females 19 - 30, LE 185% FPL	138	171	213	220	262	311	255	72.2	256	357	501	558	692	926	500	49.8
Females 19 - 30, GT 185% FPL	158	188	225	230	266	309	255	69.4	297	414	590	659	827	1,107	500	37.5
Females 31 - 50, LE 185% FPL	133	166	211	220	263	318	265	75.7	286	382	518	572	700	920	500	46.8
Females 31 - 50, GT 185% FPL	159	195	237	244	285	336	265	65.8 **	326	445	614	673	833	1,091	500	33.2 *
Females 51 - 70, LE 185% FPL	138	168	206	213	250	298	265	80.9	258	366	528	610	756	1,053	500	45.9
Females 51 - 70, GT 185% FPL	165	198	239	246	286	334	265	65.1 **	354	475	647	715	875	1,155	500	28.6 **
Females 71+, LE 185% FPL	130	159	195	200	236	277	265	86.7	324	461	669	793	974	1,394	500	29.8
Females 71+, GT 185% FPL	145	185	235	242	291	346	265	64.5 **	415	542	742	817	1,009	1,301	500	19.7
				Iron (mg/d)								**Zinc (mg/d)**				
Kids 4 - 8, LE 185% FPL	9.5	11.2	13.5	14.0	16.2	19.3	4.1	<1	7.0	8.2	9.7	10.0	11.5	13.5	4.0	0.1
Kids 4 - 8, GT 185% FPL	9.5	11.2	13.4	13.9	16.1	18.8	4.1	<1	6.5	7.7	9.2	9.4	10.9	12.7	4.0	0.1
Kids 9 - 13, LE 185% FPL	10.7	12.6	14.8	15.3	17.5	20.5	5.9/5.7	<1	8.0	9.2	10.7	11.0	12.5	14.3	7.0	3.5
Kids 9 - 13, GT 185% FPL	10.6	12.9	15.9	16.6	19.5	23.5	5.9/5.7	1.2	7.7	9.2	11.1	11.5	13.4	15.9	7.0	5.7

Table 7a

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy		
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	
Males 14 - 18, LE 185% FPL	12.6	15.1	18.5	19.4	22.7	27.5	7.7	<1	9.1	11.2	14.0	14.5	17.2	20.7	8.5	6.9	
Males 14 - 18, GT 185% FPL	12.4	15.4	19.5	20.7	24.7	30.6	7.7	<1	10.8	12.3	14.4	14.7	16.7	19.2	8.5	1.0	
Males 19 - 30, LE 185% FPL	12.8	15.2	18.1	18.7	21.5	25.2	6.0	<1	9.9	12.0	14.6	15.2	17.7	21.1	9.4	7.4	
Males 19 - 30, GT 185% FPL	12.5	15.1	18.6	19.8	23.1	28.5	6.0	<1	9.5	11.5	14.0	14.7	17.1	20.6	9.4	9.5	
Males 31 - 50, LE 185% FPL	10.4	13.5	17.7	19.2	23.2	29.9	6.0	1.1	9.1	11.3	14.1	15.0	17.8	22.0	9.4	11.8	
Males 31 - 50, GT 185% FPL	11.9	14.3	17.9	18.9	22.1	27.0	6.0	<1	9.2	11.0	13.6	14.2	16.7	20.2	9.4	11.6	
Males 51 - 70, LE 185% FPL	9.2	11.9	15.2	16.1	19.3	24.1	6.0	2.2	7.7	9.4	11.4	11.9	13.9	16.6	9.4	25.6	
Males 51 - 70, GT 185% FPL	10.7	13.3	16.5	17.5	20.6	25.5	6.0	<1	8.1	9.9	12.3	13.0	15.3	18.9	9.4	20.3	
Males 71+, LE 185% FPL	7.7	9.8	13.0	14.1	17.1	21.9	6.0	4.0	5.7	7.1	9.1	9.5	11.4	13.9	9.4	53.9	
Males 71+, GT 185% FPL	9.5	12.3	16.3	17.5	21.4	27.1	6.0	1.8	7.4	9.1	11.5	12.3	14.6	17.9	9.4	28.4	*
Females 14 - 18, LE 185% FPL	8.7	10.7	13.0	13.5	15.8	18.9	7.9	10.7	7.2	8.3	9.8	10.0	11.5	13.1	7.3	11.4	
Females 14 - 18, GT 185% FPL	8.7	10.5	12.8	13.5	15.7	19.1	7.9	12.5	6.1	7.5	9.4	9.8	11.7	14.0	7.3	22.1	
Females 19 - 30, LE 185% FPL	8.0	9.9	12.6	13.1	15.7	19.1	8.1	16.8	6.3	7.4	8.9	9.1	10.5	12.1	6.8	16.1	
Females 19 - 30, GT 185% FPL	8.8	10.6	12.8	13.4	15.6	18.7	8.1	14.8	6.4	7.7	9.3	9.6	11.1	13.1	6.8	13.7	
Females 31 - 50, LE 185% FPL	7.2	8.9	11.3	12.1	14.4	18.0	8.1	23.3	5.5	6.9	9.0	9.8	11.7	14.9	6.8	23.9	
Females 31 - 50, GT 185% FPL	8.2	10.1	12.6	13.4	15.9	19.6	8.1	16.7	6.3	7.5	9.1	9.5	11.1	13.0	6.8	15.5	*
Females 51 - 70, LE 185% FPL	6.9	8.6	10.9	11.6	13.7	17.1	5.0	3.6	5.2	6.3	7.7	8.0	9.4	11.2	6.8	33.4	
Females 51 - 70, GT 185% FPL	8.4	10.1	12.2	12.8	14.8	17.8	5.0	1.2	6.0	7.1	8.6	8.9	10.4	12.3	6.8	20.0	**
Females 71+, LE 185% FPL	6.4	8.1	10.5	11.2	13.5	16.9	5.0	5.2	4.5	5.5	6.9	7.3	8.7	10.5	6.8	47.9	
Females 71+, GT 185% FPL	8.0	10.1	12.7	13.4	16.0	19.5	5.0	1.8	6.0	7.3	8.9	9.2	10.7	12.9	6.8	18.3	**

Source: 1994-1996, 1998 CSFII.

[a]EAR = Estimated Average Requirement. For Vitamin C, the EAR is 35 mg/d higher for smokers. For calcium, the value is an AI = Adequate Intake.

[b]For most nutrients, the % Inadequate = % < EAR. For iron, the probability approach is used to estimate the % Inadequate.

*(**): p-value for difference between LE 185% FPL and GT 185% FPL is < 0.05(0.01)

Table 7a

subgroups. For young children, the prevalence of inadequate usual intake is lower, and the differences between low-income and higher-income subgroups are less.

Both the mean and median of usual energy intake of the low-income and higher-income adult subgroups, as well as the estimated percentiles of the usual energy intake distributions, are considerably less than the comparable percentiles of the EER distributions (Table 7b). In contrast, for children 4 to 8 years and 9 to 13 years, mean energy intake exceeds the mean estimated energy requirement.

The usual intake of macronutrients shows results similar to those presented for overweight and non-overweight subgroups—high percentages with usual intakes of fat and carbohydrate and low percentages with usual protein intake that fall outside the AMDRs (Table 7c). For some low-income subgroups—children, males 19 to 30 years, and males 71 years and over—the percentage with usual fat intakes above the upper bound of the AMDR is higher than for their higher-income counterparts. In addition, low-income adult females have a higher prevalence of inadequate protein intakes compared with higher-income adult females.

Usual intakes of dietary fiber for low-income and higher-income subgroups are far below the AI set for total fiber (Table 7d). For all income subgroups, mean usual dietary fiber intake is considerably less than the AI.

FSP and WIC Participants. For FSP participants, all micronutrients show a high prevalence of inadequacy for adolescent and adult females; all except iron and zinc have a high prevalence of inadequacy for adolescent and adult males; and, with the exception of vitamin E, the prevalence of inadequate usual intakes of micronutrients is low for children 4 to 8 years of age (Table 8a). (Recall that some FSP participant subgroups—males 14 to 18 and 19 to 30 years and females 14 to 18 years—have small sample sizes, making estimates of the usual intake

Table 7b

Estimated Energy Requirements and Usual Intake of Food Energy: Low-Income Individuals

	Distribution Percentiles (kcal)							Distribution Percentiles (kcal)						
	10th	25th	Median	Mean	75th	90th		10th	25th	Median	Mean		75th	90th
Kids 4 - 8, LE 185% FPL[a]							Kids 4 - 8, GT 185% FPL							
Usual intake	1,327	1,525	1,770	1,806	2,050	2,328	Usual intake	1,375	1,549	1,752	1,776		1,977	2,207
EER[b]	1,242	1,357	1,514	1,542	1,682	1,881	EER	1,286	1,402	1,543	1,561		1,703	1,860
Kids 9 - 13, LE 185% FPL							Kids 9 - 13, GT 185% FPL							
Usual intake	1,516	1,731	1,991	2,017	2,275	2,551	Usual intake	1,518	1,770	2,076	2,130	*	2,428	2,808
EER	1,591	1,777	1,971	2,027	2,223	2,529	EER	1,641	1,799	2,009	2,070		2,278	2,647
Males 14 - 18, LE 185% FPL							Males 14 - 18, GT 185% FPL							
Usual intake	1,984	2,305	2,707	2,764	3,160	3,617	Usual intake	1,850	2,245	2,766	2,876		3,387	4,044
EER	2,384	2,647	2,897	2,933	3,189	3,517	EER	2,420	2,663	2,912	2,947		3,206	3,522
Males 19 - 30, LE 185% FPL							Males 19 - 30, GT 185% FPL							
Usual intake	1,892	2,314	2,819	2,919	3,407	4,064	Usual intake	1,838	2,211	2,669	2,763		3,207	3,802
EER	2,407	2,665	2,873	2,901	3,109	3,414	EER	2,465	2,678	2,889	2,889		3,087	3,276
Males 31 - 50, LE 185% FPL							Males 31 - 50, GT 185% FPL							
Usual intake	1,615	2,013	2,511	2,639	3,119	3,821	Usual intake	1,723	2,053	2,466	2,524		2,932	3,398
EER	2,382	2,520	2,739	2,783	3,018	3,222	EER	2,396	2,586	2,807	2,817		3,031	3,240
Males 51 - 70, LE 185% FPL							Males 51 - 70, GT 185% FPL							
Usual intake	1,300	1,597	1,952	2,010	2,357	2,791	Usual intake	1,468	1,768	2,144	2,194	**	2,565	2,985
EER	2,105	2,329	2,554	2,558	2,799	2,984	EER	2,214	2,411	2,646	2,642		2,853	3,089
Males 71+, LE 185% FPL							Males 71+, GT 185% FPL							
Usual intake	1,013	1,254	1,543	1,608	1,885	2,281	Usual intake	1,359	1,601	1,894	1,924	**	2,215	2,527
EER	1,883	2,069	2,289	2,290	2,498	2,712	EER	1,918	2,132	2,359	2,351		2,587	2,759
Females 14 - 18, LE 185% FPL							Females 14 - 18, GT 185% FPL							
Usual intake	1,500	1,709	1,936	1,959	2,181	2,442	Usual intake	1,324	1,560	1,846	1,874		2,158	2,461
EER	1,800	1,919	2,069	2,106	2,220	2,454	EER	1,847	1,943	2,084	2,107		2,214	2,398
Females 19 - 30, LE 185% FPL							Females 19 - 30, GT 185% FPL							
Usual intake	1,213	1,459	1,760	1,792	2,090	2,413	Usual intake	1,285	1,521	1,810	1,842		2,128	2,440
EER	1,891	2,043	2,218	2,273	2,457	2,683	EER	1,891	2,026	2,161	2,211		2,349	2,587
Females 31 - 50, LE 185% FPL							Females 31 - 50, GT 185% FPL							
Usual intake	1,122	1,357	1,645	1,694	1,976	2,328	Usual intake	1,192	1,417	1,673	1,706		1,957	2,259
EER	1,838	2,004	2,191	2,220	2,380	2,611	EER	1,812	1,952	2,132	2,162		2,343	2,562
Females 51 - 70, LE 185% FPL							Females 51 - 70, GT 185% FPL							
Usual intake	955	1,152	1,397	1,427	1,669	1,939	Usual intake	1,111	1,306	1,545	1,572	**	1,808	2,066
EER	1,701	1,843	2,016	2,055	2,233	2,453	EER	1,688	1,852	2,034	2,039		2,207	2,397
Females 71+, LE 185% FPL							Females 71+, GT 185% FPL							
Usual intake	862	1,028	1,232	1,254	1,456	1,675	Usual intake	1,071	1,250	1,467	1,488	**	1,704	1,934
EER	1,481	1,671	1,822	1,841	2,013	2,139	EER	1,481	1,611	1,812	1,816		1,984	2,167

Source: 1994-1996, 1998 CSFII.

[a]FPL = Federal Poverty Level.

[b]EER = Estimated Energy Requirement.

*(**): p-value for difference in mean intakes between LE 185% FPL and GT 185% FPL < 0.05(0.01)

Table 7c
Usual Nutrient Intake: Macronutrients, Low-Income Individuals

	Fat		Carbohydrate		Protein	
	% < AMDR[a]	% > AMDR	% Inadeq[b]	% < AMDR	% Inadeq	% outside AMDR
Kids 4 - 8, LE 185% FPL[c]	< 1	32.9	< 1	2.5	< 1	< 1
Kids 4 - 8, GT 185% FPL	2.3	14.4 **	< 1	0.5 **	< 1	1.3
Kids 9 - 13, LE 185% FPL	< 1	33.4	< 1	1.9	1.5	< 1
Kids 9 - 13, GT 185% FPL	1.5	19.3 **	< 1	0.6	1.4	< 1
Males 14 - 18, LE 185% FPL	< 1	50.9	< 1	6.4	2.3	< 1
Males 14 - 18, GT 185% FPL	2.3	18.5 **	< 1	0.5	< 1	< 1
Males 19 - 30, LE 185% FPL	< 1	37.4	< 1	26.6	2.3	< 1
Males 19 - 30, GT 185% FPL	< 1	20.7 *	< 1	14.5 *	2.7	< 1
Males 31 - 50, LE 185% FPL	< 1	42.1	< 1	28.5	4.4	< 1
Males 31 - 50, GT 185% FPL	< 1	38.3	< 1	25.7	3.2	< 1
Males 51 - 70, LE 185% FPL	1.3	40.5	2.1	28.9	13.2	< 1
Males 51 - 70, GT 185% FPL	1.2	41.7	< 1	28.6	7.0 *	< 1
Males 71+, LE 185% FPL	1.4	41.3	3.6	25.8	25.2	< 1
Males 71+, GT 185% FPL	1.1	33.0	< 1	16.8 *	9.5 **	< 1
Females 14 - 18, LE 185% FPL	< 1	27.2	< 1	2.5	3.8	2.5
Females 14 - 18, GT 185% FPL	8.6 **	25.2	< 1	3.4	6.7	< 1
Females 19 - 30, LE 185% FPL	1.9	29.2	1.1	10.6	13.4	1.4
Females 19 - 30, GT 185% FPL	1.1	30.1	< 1	12.9	7.0 *	2.6
Females 31 - 50, LE 185% FPL	< 1	40.4	2.2	19.1	17.9	< 1
Females 31 - 50, GT 185% FPL	< 1	32.0 *	2.1	16.6	10.8 *	< 1
Females 51 - 70, LE 185% FPL	1.1	34.9	4.6	14.0	26.9	< 1
Females 51 - 70, GT 185% FPL	2.2	31.1	1.9	18.1	13.4 **	< 1
Females 71+, LE 185% FPL	2.0	26.3	6.8	10.9	31.9	< 1
Females 71+, GT 185% FPL	2.2	29.6	2.1	11.4	10.8 **	< 1

Source: 1994-1996, 1998 CSFII.

[a]AMDR = Acceptable Macronutrient Distribution Range.

[b]% Inadequate = % < EAR (Estimated Average Requirement).

[c]FPL = Federal Poverty Level.

*(**): p-value for difference between LE 185% FPL and GT 185% FPL is < 0.05(0.01)

Table 7d

Usual Intake of Dietary Fiber: Low-Income Individuals

	Usual Intake Distributions (g/d)						
	AI[a]	10th	25th	Median	Mean	75th	90th
Kids 4 - 8, LE 185% FPL[b]	25	8	10	12	12	14	17
Kids 4 - 8, GT 185% FPL	25	8	10	12	12	14	16
Kids 9 - 13, LE 185% FPL	31/26	8	10	13	13	15	19
Kids 9 - 13, GT 185% FPL	31/26	10	12	14	15 **	17	20
Males 14 - 18, LE 185% FPL	38	12	14	16	17	19	22
Males 14 - 18, GT 185% FPL	38	11	14	17	18	22	26
Males 19 - 30, LE 185% FPL	38	10	14	18	19	23	28
Males 19 - 30, GT 185% FPL	38	10	13	17	18	22	28
Males 31 - 50, LE 185% FPL	38	10	13	17	19	23	29
Males 31 - 50, GT 185% FPL	38	11	14	18	19	23	28
Males 51 - 70, LE 185% FPL	30	8	11	16	17	21	27
Males 51 - 70, GT 185% FPL	30	10	14	18	19 **	23	28
Males 71+, LE 185% FPL	30	8	11	14	15	18	22
Males 71+, GT 185% FPL	30	10	13	18	19 **	23	29
Females 14 - 18, LE 185% FPL	26	10	11	12	12	13	15
Females 14 - 18, GT 185% FPL	26	8	10	13	13	15	18
Females 19 - 30, LE 185% FPL	25	7	9	12	13	15	19
Females 19 - 30, GT 185% FPL	25	8	10	13	13	16	20
Females 31 - 50, LE 185% FPL	25	7	9	12	12	15	19
Females 31 - 50, GT 185% FPL	25	8	11	14	14 **	18	21
Females 51 - 70, LE 185% FPL	21	8	10	12	13	15	19
Females 51 - 70, GT 185% FPL	21	9	11	14	15 **	18	22
Females 71+, LE 185% FPL	21	7	9	12	13	15	19
Females 71+, GT 185% FPL	21	8	11	15	15 **	19	23

Source: 1994-1996, 1998 CSFII.

[a]AI = Adequate Intake.

[b]FPL = Federal Poverty Level.

*(**): p-value for difference in mean intakes between LE 185% FPL and GT 185% FPL is < 0.05(0.01)

Table 8a

Usual Nutrient Intake: Micronutrients, FSP and WIC Participants

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
	Vitamin C (mg/d)								**Vitamin E (mg/d)**							
	FSP[c] participants and income-eligible nonparticipants								**FSP participants and income-eligible nonparticipants**							
Kids 4 - 8, FSP	57	76	101	107	132	165	22	< 1	4	5	6	7	8	9	6	42.0
Kids 4 - 8, not in FSP	49	67	91	98	122	155	22	< 1	4	5	6	6	7	8	6	57.4 **
Kids 9 - 13, FSP	45	61	83	89	110	140	39	6.0	5	6	7	7	8	10	9	84.7
Kids 9 - 13, not in FSP	48	66	91	100	124	162	39	4.8	4	5	6	7	8	10	9	87.0
Males 14 - 18, FSP	44	65	96	107	137	185	63	26.8	6	7	9	9	10	12	12	89.5
Males 14 - 18, not in FSP	51	70	99	110	138	183	63	18.8	6	7	8	9	10	12	12	88.7
Males 19 - 30, FSP	56	71	90	95	113	139	75	46.0	6	7	9	9	11	13	12	84.1
Males 19 - 30, not in FSP	59	81	113	125	155	205	75	20.7	6	8	10	11	13	15	12	70.0
Males 31 - 50, FSP	42	61	91	105	133	185	75	54.7	5	7	9	10	12	15	12	74.7
Males 31 - 50, not in FSP	37	58	92	109	142	202	75	37.9	5	7	9	9	11	14	12	80.6
Males 51+, FSP	28	49	84	106	139	210	75	52.4	4	5	7	7	9	11	12	94.9
Males 51+, not in FSP	25	42	70	84	110	161	75	54.2	4	5	6	7	8	11	12	94.0
Females 14 - 18, FSP	51	65	86	91	110	137	56	21.0	4	5	6	6	8	10	12	98.1
Females 14 - 18, not in FSP	36	48	67	74	91	120	56	35.5	4	5	7	7	9	11	12	94.8
Females 19 - 30, FSP	35	53	80	91	117	160	60	43.4	4	5	6	7	8	9	12	99.5
Females 19 - 30, not in FSP	44	62	90	100	126	169	60	22.8	4	5	7	7	8	10	12	95.2
Females 31 - 50, FSP	40	55	76	83	104	135	60	47.8	4	5	6	7	8	10	12	96.3
Females 31 - 50, not in FSP	32	48	71	80	103	139	60	38.4	4	5	6	6	7	9	12	99.5
Females 51+, FSP	33	47	67	74	93	123	60	49.9	3	4	6	6	7	9	12	99.0
Females 51+, not in FSP	35	51	77	87	111	151	60	33.5 *	3	4	5	5	6	8	12	98.7
	WIC[d] participants and income-eligible nonparticipants								**WIC participants and income-eligible nonparticipants**							
Infants < 1, WIC	46	69	96	107	134	182	…	…	4	8	10	10	13	17	…	…
Infants < 1, not in WIC	30	50	77	84	110	145	…	…	2	4	9	9	12	16	…	…
Toddlers 1 - 3, WIC	56	78	110	116	146	184	13	< 1	3	4	5	5	7	9	5	51.8
Toddlers 1 - 3, not in WIC	43	61	87	96	121	159	13	< 1	3	4	5	5	6	7	5	57.6
	Folate (mcg/d)								**Calcium (mg/d)**							
	FSP participants and income-eligible nonparticipants								**FSP participants and income-eligible nonparticipants**							
Kids 4 - 8, FSP	170	217	281	297	359	443	160	7.7	576	708	872	893	1,055	1,236	**800**	…
Kids 4 - 8, not in FSP	168	207	258	270	320	387	160	7.7	555	674	819	842	983	1,156	**800**	…
Kids 9 - 13, FSP	147	179	221	228	268	316	250	66.5	550	676	838	866	1,025	1,217	**1,300**	…
Kids 9 - 13, not in FSP	157	193	242	253	301	364	250	54.0	688	778	887	898	1,006	1,123	**1,300**	…
Males 14 - 18, FSP	189	220	259	265	304	349	330	85.0	649	798	990	1,023	1,212	1,438	**1,300**	…
Males 14 - 18, not in FSP	181	212	250	254	291	332	330	89.4	573	734	954	1,013	1,228	1,528	**1,300**	…
Males 19 - 30, FSP	181	217	264	274	321	380	320	74.7	440	584	770	800	984	1,199	**1,000**	…
Males 19 - 30, not in FSP	224	278	349	363	433	521	320	39.7 *	658	837	1,078	1,134 *	1,370	1,684	**1,000**	…
Males 31 - 50, FSP	161	196	243	255	303	366	320	80.2	454	621	865	953	1,188	1,562	**1,000**	…
Males 31 - 50, not in FSP	166	211	272	288	348	431	320	67.1	473	601	776	821	991	1,226	**1,000**	…
Males 51+, FSP	114	159	224	246	308	405	320	77.5	319	427	582	631	781	1,004	**1,200**	…

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
Males 51+, not in FSP	127	167	224	241	296	377	320	80.7	338	455	617	663	822	1,047	**1,200**	…
Females 14 - 18, FSP	138	169	211	218	259	309	330	93.5	354	471	631	672	828	1,042	**1,300**	…
Females 14 - 18, not in FSP	132	156	188	193	224	261	330	98.8	477	575	695	709	829	959	**1,300**	…
Females 19 - 30, FSP	122	154	196	204	246	298	320	93.6	369	473	605	624	754	902	**1,000**	…
Females 19 - 30, not in FSP	133	174	231	249	305	388	320	78.7	406	515	657	685	825	999	**1,000**	…
Females 31 - 50, FSP	101	134	179	191	236	297	320	93.1	272	376	520	558	699	892	**1,000**	…
Females 31 - 50, not in FSP	110	141	185	196	238	297	320	93.3	318	428	581	623	772	982	**1,000**	…
Females 51+, FSP	112	139	176	185	220	269	320	96.5	271	356	472	499	613	763	**1,200**	…
Females 51+, not in FSP	111	144	191	205	250	316	320	90.6	277	376	509	539	670	840	**1,200**	…
WIC participants and income-eligible nonparticipants									**WIC participants and income-eligible nonparticipants**							
Infants < 1, WIC	62	86	116	123	150	189	…	…	292	446	584	616	770	940	**210/270**	…
Infants < 1, not in WIC	32	68	99	107	140	184	…	…	141	358	548	601	813	1,090	**210/270**	…
Toddlers 1 - 3, WIC	128	168	221	234	286	357	120	7.7	484	630	819	850	1,036	1,257	**500**	…
Toddlers 1 - 3, not in WIC	127	162	210	221	267	329	120	7.8	446	586	766	805	981	1,212	**500**	…
	Magnesium (mg/d)								**Vitamin A (mcg RAE)**							
FSP participants and income-eligible nonparticipants									**FSP participants and income-eligible nonparticipants**							
Kids 4 - 8, FSP	163	190	222	227	259	298	110	< 1	426	538	683	721	861	1,063	275	1.1
Kids 4 - 8, not in FSP	158	183	214	218	247	283	110	< 1	369	470	614	665	797	1,027	275	2.0
Kids 9 - 13, FSP	160	185	216	221	252	289	200	36.7	351	438	552	574	686	824	445/420	21.3
Kids 9 - 13, not in FSP	178	200	227	230	257	286	200	25.0	380	486	635	701	840	1,097	445/420	16.5
Males 14 - 18, FSP	212	245	285	290	330	374	340	79.4	513	597	705	726	832	964	630	32.4
Males 14 - 18, not in FSP	198	229	265	269	305	344	340	89.0	365	452	568	594	707	856	630	62.4
Males 19 - 30, FSP	209	246	292	299	344	397	330	69.1	370	455	566	585	694	825	625	62.7
Males 19 - 30, not in FSP	222	279	352	366	438	526	330	42.2 *	495	600	738	767	902	1,076	625	29.4
Males 31 - 50, FSP	163	219	294	312	385	483	350	66.6	321	458	669	759	959	1,309	625	45.1
Males 31 - 50, not in FSP	212	257	316	326	384	454	350	63.7	275	383	548	620	775	1,052	625	60.0
Males 51+, FSP	142	188	249	262	322	398	350	81.8	296	453	687	866	1,048	1,601	625	43.8
Males 51+, not in FSP	153	194	250	263	318	391	350	83.0	306	460	706	826	1,057	1,493	625	42.3
Females 14 - 18, FSP	152	178	209	212	243	277	300	95.5	286	387	526	563	699	886	485	42.7
Females 14 - 18, not in FSP	198	209	222	223	236	249	300	100.0	333	392	470	487	563	663	485	54.8
Females 19 - 30, FSP	139	168	203	207	242	280	255	81.2	203	301	446	494	634	847	500	58.4
Females 19 - 30, not in FSP	147	181	225	232	276	327	255	65.9	313	413	554	594	731	927	500	40.5
Females 31 - 50, FSP	129	165	210	220	263	323	265	75.9	268	363	500	543	676	872	500	49.9
Females 31 - 50, not in FSP	140	173	216	224	266	318	265	74.5	290	383	514	565	688	900	500	47.5
Females 51+, FSP	130	156	189	194	226	263	265	90.5	230	319	456	541	662	946	500	56.8
Females 51+, not in FSP	132	161	196	201	236	275	265	87.0	277	399	586	693	860	1,230	500	39.0 **
WIC participants and income-eligible nonparticipants									**WIC participants and income-eligible nonparticipants**							
Infants < 1, WIC	41	60	85	93	118	154	…	…	373	475	626	658	806	1,017	…	…
Infants < 1, not in WIC	26	47	81	91	123	170	…	…	178	365	544	577	753	988	…	…
Toddlers 1 - 3, WIC	128	156	189	194	227	266	65	< 1	357	454	582	620	743	929	210	< 1
Toddlers 1 - 3, not in WIC	122	148	182	186	220	257	65	< 1	353	443	559	587	699	854	210	< 1

Table 8a

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
	Iron (mg/d)								**Zinc (mg/d)**							
	FSP participants and income-eligible nonparticipants								**FSP participants and income-eligible nonparticipants**							
Kids 4 - 8, FSP	10.0	11.9	14.5	15.1	17.6	21.0	4.1	<1	7.4	8.6	10.2	10.5	12.0	13.9	4.0	< 1
Kids 4 - 8, not in FSP	9.4	10.9	12.9	13.4	15.3	18.0	4.1	<1	6.9	8.0	9.4	9.7	11.1	12.9	4.0	< 1
Kids 9 - 13, FSP	9.6	11.6	14.2	14.8	17.3	20.5	5.9/5.7	<1	7.1	8.6	10.6	11.0	12.9	15.3	7.0	9.4
Kids 9 - 13, not in FSP	10.2	11.7	13.7	14.0	15.9	18.1	5.9/5.7	<1	8.3	9.1	10.1	10.2	11.2	12.3	7.0	< 1
Males 14 - 18, FSP	14.2	15.8	17.8	18.0	20.0	22.1	7.7	<1	10.7	11.8	13.1	13.2	14.5	15.9	8.5	< 1
Males 14 - 18, not in FSP	10.1	12.6	15.9	16.5	19.8	23.9	7.7	4.1	7.6	9.7	12.5	13.2	16.0	19.7	8.5	15.5
Males 19 - 30, FSP	10.6	13.3	16.7	17.2	20.5	24.3	6.0	1.3	9.1	11.2	13.9	14.3	16.9	19.9	9.4	11.5
Males 19 - 30, not in FSP	13.8	16.3	19.4	20.0	23.1	27.1	6.0	<1	9.7	12.0	14.8	15.5	18.2	22.0	9.4	8.4
Males 31 - 50, FSP	11.0	14.2	18.9	20.5	25.3	32.4	6.0	<1	9.3	11.7	14.7	15.5	18.4	22.6	9.4	10.4
Males 31 - 50, not in FSP	11.2	13.5	16.5	17.4	20.3	24.7	6.0	<1	10.1	11.7	13.7	14.0	16.0	18.4	9.4	5.8
Males 51+, FSP	8.6	11.2	14.6	15.2	18.6	22.7	6.0	3.2	7.2	8.6	10.5	10.8	12.7	14.9	9.4	35.3
Males 51+, not in FSP	8.2	10.4	13.5	14.4	17.4	21.8	6.0	3.0	6.4	7.8	9.6	10.0	11.8	14.2	9.4	47.0
Females 14 - 18, FSP	7.9	10.1	13.0	13.5	16.4	19.8	7.9	15.3	6.3	7.8	9.6	9.9	11.8	13.9	7.3	19.5
Females 14 - 18, not in FSP	9.5	11.1	13.2	13.5	15.5	17.9	7.9	5.1	7.3	8.5	9.9	10.1	11.5	13.1	7.3	9.8
Females 19 - 30, FSP	7.8	9.8	12.5	12.9	15.6	18.8	8.1	18.8	5.9	7.3	9.1	9.4	11.2	13.3	6.8	18.7
Females 19 - 30, not in FSP	8.8	10.6	13.0	13.5	15.8	18.8	8.1	14.1	6.8	7.9	9.2	9.4	10.8	12.3	6.8	10.4
Females 31 - 50, FSP	7.1	9.1	11.8	12.4	15.0	18.4	8.1	22.2	5.3	6.7	8.9	9.6	11.5	14.6	6.8	25.6
Females 31 - 50, not in FSP	7.3	9.0	11.1	11.5	13.6	16.3	8.1	24.0	5.6	7.1	9.1	9.8	11.8	14.8	6.8	22.1
Females 51+, FSP	6.9	8.4	10.3	10.9	12.7	15.6	5.0	4.2	5.7	6.4	7.4	7.6	8.6	9.7	6.8	33.9
Females 51+, not in FSP	6.5	8.2	10.7	11.4	13.8	17.3	5.0	5.0	4.5	5.5	7.0	7.3	8.7	10.6	6.8	47.0
	WIC participants and income-eligible nonparticipants								**WIC participants and income-eligible nonparticipants**							
Infants ≤ 6 months, WIC	5.9	9.3	12.6	13.5	16.6	22.1	…	…	2.8	4.3	5.9	6.0	7.4	8.9	…	…
Infants < 6 months, not in WIC	1.8	6.2	9.7	11.2	15.7	19.9	…	…	1.1	2.5	4.3	4.6	6.4	8.5	…	…
Infants 7 - 11 months, WIC	8.7	12.0	16.1	16.7	20.8	25.4	6.9	7.1	3.9	5.2	6.7	6.8	8.2	9.9	2.5	2.7
Infants 7 - months, not in WIC	5.5	8.7	13.6	15.4	20.2	27.7	6.9	17.2	2.9	4.4	6.2	6.3	8.0	9.7	2.5	7.0
Toddlers 1 - 3, WIC	7.1	9.1	11.8	12.4	15.0	18.5	3.0	1.1	5.2	6.3	7.8	8.2	9.7	11.6	2.5	< 1
Toddlers 1 - 3, not in WIC	6.7	8.3	10.4	11.1	13.1	16.2	3.0	1.3	5.3	6.4	7.7	8.1	9.4	11.2	2.5	< 1

Source: 1994-1996, 1998 CSFII.

[a]EAR = Estimated Average Requirement. For Vitamin C, the EAR is 35 mg/d higher for smokers. For calcium, the value is an AI = Adequate Intake.

[b]For most nutrients, the % Inadequate = % < EAR. For iron, the probability approach is used to estimate the % Inadequate.

[c]FSP = Food Stamp Program.

[d]WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

*(**): p-value for difference between participants and income-eligible nonparticipants is <0.05(0.01)

Table 8a

distributions and the prevalence of inadequacy less precise than FSP subgroups with larger sample sizes.)

Most differences between FSP participants and income-eligible nonparticipants in the percentage with inadequate intake are small, with the following exceptions:

- The prevalence of inadequate usual intakes of vitamin C is higher for most of the adolescent and adult FSP participant groups than for income-eligible nonparticipants, although the difference is statistically significant only for females 51 years of age and over.
- Male FSP participants 19 to 30 years of age have a higher prevalence of inadequate intake of most nutrients (except iron) than income-eligible nonparticipants. The differences are statistically significant for folate and magnesium.

For calcium, mean usual intake of FSP participants is generally less than the mean usual intake for income-eligible nonparticipants. Males 19 to 30 years of age show an unusually large and significant difference in mean intakes of calcium—800 mg/d for FSP participants compared with 1,134 mg/d for income-eligible nonparticipants. For children 4 to 8 years and males 14-18 years and 31-50 years, however, the mean calcium intake of FSP participants is close to or even higher than the mean for nonparticipants.

Differences in nutrient adequacy for WIC participants and nonparticipants show that infants and toddlers participating in WIC generally have higher mean intakes, as well as higher usual intake percentiles, than income-eligible nonparticipants (Table 8a). For most nutrients, however, the prevalence of inadequacy is low and differences between WIC participants and income-eligible nonparticipants are not large. For iron, however, 7.1 percent of WIC infants 7 to 11 months of age have inadequate intakes compared with 17.2 percent of income-eligible nonparticipants.

Both the mean and median of usual energy intake of adolescent and adult females, as well as the estimated percentiles of the usual energy intake distributions, are considerably less than the

comparable percentiles of the EER distributions (Table 8b). This pattern is observed for both FSP participants and income-eligible nonparticipants. For males, the difference between mean energy intake and mean EER is less than for females and not consistent in direction. For children 4 to 8 years, mean energy intake exceeds the mean estimated energy requirement, while for children 9 to 13 years, mean energy intake is close to mean EER.

For infants and children receiving WIC, and for eligible nonparticipating children, mean energy intake exceeds mean EER (Table 8b). An important caveat to this result, however, is that breastfeeding infants and toddlers are included in these analyses. Since the CSFII data do not include energy and nutrients from breast milk, energy intake for breastfeeding infants and toddlers is underestimated. To the extent that breastfeeding is less prevalent among WIC infants than among eligible nonparticipants (Schwartz, et al. 1992), mean energy intake will be underestimated more for eligible nonparticipants than for WIC participants. In addition, the difference between mean intake and mean EER for both WIC participants and nonparticipants would be even larger if the energy from breast milk were included in the nutrient totals.[2]

Results for macronutrients are similar to findings presented for other subgroups. High proportions of children, adolescents, and adults have usual fat intake outside the AMDR (above the upper bound); lower, but still relatively high, proportions of adult subgroups have usual carbohydrate intake below the lower bound of the AMDR; and, for some subgroups, the prevalence of inadequate protein intake is moderately high, although the proportion outside the AMDR for protein is low, usually under one percent (Table 8c). Some FSP participant

[2] An alternative would have been to delete breastfeeding infants and toddlers from the analysis. However, this would have deleted a large proportion of the infant and toddler sample and left a very self-selected sample for analysis purposes. Even with energy and nutrient intakes underestimated for infants under age 1 due to the exclusion of breast milk, usual intakes of micronutrients are adequate for almost all nutrients examined.

Table 8b

Estimated Energy Requirements and Usual Intake of Food Energy: FSP and WIC Participants

	Distribution Percentiles (kcal)							Distribution Percentiles (kcal)						
	10th	25th	Median	Mean	75th	90th		10th	25th	Median	Mean	75th	90th	
FSP[a] participants and income-eligible nonparticipants														
Kids 4 - 8, FSP							Kids 4 - 8, not in FSP							
Usual intake	1,354	1,578	1,839	1,877	2,132	2,446	Usual intake	1,328	1,496	1,715	1,751	*	1,968	2,221
EER[b]	1,225	1,344	1,525	1,530	1,703	1,854	EER	1,227	1,349	1,495	1,523		1,654	1,835
Kids 9 - 13, FSP							Kids 9 - 13, not in FSP							
Usual intake	1,409	1,665	1,982	2,020	2,333	2,680	Usual intake	1,550	1,720	1,925	1,945		2,149	2,367
EER	1,622	1,802	1,975	2,031	2,240	2,601	EER	1,595	1,789	1,988	2,065		2,229	2,702
Males 14 - 18, FSP							Males 14 - 18, not in FSP							
Usual intake	2,185	2,420	2,699	2,719	2,996	3,281	Usual intake	1,940	2,296	2,745	2,813		3,256	3,773
EER	2,384	2,661	2,978	2,953	3,244	3,517	EER	2,489	2,689	2,935	2,940		3,146	3,450
Males 19 - 30, FSP							Males 19 - 30, not in FSP							
Usual intake	1,939	2,298	2,727	2,760	3,186	3,624	Usual intake	1,864	2,346	2,937	3,079		3,647	4,464
EER	2,447	2,694	2,829	2,920	3,109	3,616	EER	2,498	2,681	2,843	2,910		3,122	3,410
Males 31 - 50, FSP							Males 31 - 50, not in FSP							
Usual intake	1,700	2,081	2,614	2,802	3,363	4,199	Usual intake	1,692	2,024	2,444	2,507		2,921	3,404
EER	2,333	2,402	2,678	2,713	3,018	3,218	EER	2,340	2,529	2,798	2,793		2,978	3,269
Males 51+, FSP							Males 51+, not in FSP							
Usual intake	1,204	1,489	1,840	1,876	2,223	2,596	Usual intake	1,082	1,329	1,652	1,715		2,032	2,429
EER	1,990	2,229	2,497	2,506	2,799	2,979	EER	2,041	2,216	2,414	2,439		2,670	2,873
Females 14 - 18, FSP							Females 14 - 18, not in FSP							
Usual intake	1,236	1,476	1,764	1,787	2,073	2,369	Usual intake	1,567	1,783	2,046	2,074	*	2,335	2,618
EER	1,849	1,985	2,095	2,150	2,336	2,442	EER	1,771	1,884	2,069	2,084		2,238	2,381
Females 19 - 30, FSP							Females 19 - 30, not in FSP							
Usual intake	1,225	1,505	1,846	1,879	2,216	2,575	Usual intake	1,245	1,485	1,778	1,810		2,101	2,417
EER	1,945	2,073	2,285	2,334	2,566	2,787	EER	1,877	1,972	2,127	2,179		2,346	2,596
Females 31 - 50, FSP							Females 31 - 50, not in FSP							
Usual intake	1,068	1,348	1,702	1,753	2,103	2,504	Usual intake	1,105	1,321	1,589	1,622	*	1,887	2,182
EER	1,903	2,060	2,220	2,255	2,391	2,712	EER	1,892	2,004	2,198	2,217		2,397	2,608
Females 51+, FSP							Females 51+, not in FSP							
Usual intake	885	1,072	1,305	1,337	1,567	1,829	Usual intake	901	1,063	1,263	1,285		1,482	1,697
EER	1,672	1,763	2,031	2,029	2,223	2,498	EER	1,519	1,679	1,883	1,913		2,111	2,309
WIC[c] participants and income-eligible nonparticipants														
Infants < 1, WIC							Infants < 1, not in WIC							
Usual intake	410	597	782	805	982	1,220	Usual intake	222	457	725	725		957	1,203
EER	454	532	653	660	777	886	EER	406	499	613	631		745	881
Toddlers 1 - 3, WIC							Toddlers 1 - 3, not in WIC							
Usual intake	939	1,135	1,378	1,408	1,649	1,917	Usual intake	970	1,157	1,379	1,419		1,641	1,920
EER	797	910	1,099	1,105	1,280	1,448	EER	869	999	1,179	1,174		1,337	1,460

Source: 1994-1996, 1998 CSFII.

[a]FSP = Food Stamp Program.

[b]EER = Estimated Energy Requirement.

[c]WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

*(**): p-value for difference between participants and income-eligible nonparticipants is <0.05(0.01)

Table 8c

Usual Nutrient Intake: Macronutrients, FSP and WIC Participants

	Fat		Carbohydrate		Protein	
	% < AMDR[a]	% > AMDR	% < EAR[b]	% < AMDR	% <Inadeq	% outside AMDR
FSP participants and income-eligible nonparticipants						
Kids 4 - 8, FSP[c]	< 1	33.4	< 1	1.1	< 1	< 1
Kids 4 - 8, not in FSP	< 1	33.8	< 1	2.2	8.1	< 1
Kids 9 - 13, FSP	< 1	47.7	< 1	<1	2.3	< 1
Kids 9 - 13, not in FSP	< 1	18.3 **	< 1	1.7	15.5 **	1
Males 14 - 18, FSP	< 1	43.8	< 1	<1	< 1	< 1
Males 14 - 18, not in FSP	< 1	40.7	< 1	8.4	11.5	3.6
Males 19 - 30, FSP	< 1	72.1	< 1	31.5	4.2	< 1
Males 19 - 30, not in FSP	< 1	31.8	< 1	23.5	2.2	1.7
Males 31 - 50, FSP	< 1	32.9	< 1	20.2	2.7	< 1
Males 31 - 50, not in FSP	1.0	40.6	< 1	29.4	3.9	< 1
Males 51+, FSP	< 1	42.0	4.6	37.5	11.9	< 1
Males 51+, not in FSP	< 1	43.3	3.3	27.9	22.8 *	< 1
Females 14 - 18, FSP	< 1	31.4	1.6	<1	6.8	< 1
Females 14 - 18, not in FSP	< 1	31.4	< 1	1.8	3.5	2.2
Females 19 - 30, FSP	< 1	33.5	1.4	12.1	17.9	1.4
Females 19 - 30, not in FSP	1.9	31.9	< 1	11.9	11.0	1.4
Females 31 - 50, FSP	< 1	32.0	3.5	11.7	24.2	2.1
Females 31 - 50, not in FSP	< 1	49.2	2.1	22.0	23.9	<1
Females 51+, FSP	< 1	35.8	7.9	16.4	37.0	< 1
Females 51+, not in FSP	2.3	28.0	5.2	9.3	34.7	< 1
WIC[d] participants and income-eligible nonparticipants						
Toddlers 1 - 3, WIC	25.4	5.5	5.7	4.8	< 1	< 1
Toddlers 1 - 3, not in WIC	20.5	4.9	2.8	11.2 **	5.1	< 1

Source: 1994-1996, 1998 CSFII.

[a]AMDR = Acceptable Macronutrient Distribution Range.

[b]% Inadequate = % with usual intakes < EAR (Estimated Average Requirement).

[c]FSP = Food Stamp Program.

[d]WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

*(**): p-value for difference between participants and income-eligible nonparticipants is <0.05(0.01)

subgroups—children 9 to 13 years and males 19 to 30 years—have a higher proportion with usual fat intake outside the AMDR than comparable nonparticipant subgroups, although the opposite pattern is observed for males 51 years and over and females 31 to 50 years. In addition, males 51 years and over participating in the FSP have a significantly lower prevalence of inadequate protein intake than income-eligible nonparticipants.

For children 1 to 3 years, two interesting results are shown in Table 8c. First, low-income children not participating in WIC are significantly more likely than WIC children to have usual carbohydrate intake below the lower bound of the AMDR. Second, they are more likely to have usual fat intake less than the lower bound of the AMDR compared with older children and adults who are more likely to be above the upper bound. This is largely the result of the fact that the lower bound of the AMDR for fat is higher for young children. Specifically, the AMDR for fat is 30 to 40 percent of energy for children 1 to 3 years, 25 to 35 percent for children 4 to 18, and 20 to 35 percent for adults. Thus, it is easier for children to have diets with usual fat intake below the AMDR.

Usual dietary fiber intakes are substantially less than the AI (Table 8d). Both participants and income-eligible nonparticipants have usual dietary fiber intake distributions that do not come close to meeting fiber recommendations.

NSLP and SBP Participants. Results for the subgroups participating in the NSLP and SBP, as well as for nonparticipants of the same age subgroups, confirm many of the findings reported for other age groups (Tables 9a and 9b). First, the prevalence of inadequacy for the micronutrients is less for younger children than for older children and for males than for females (Table 9a). Second, the nutrients with highest prevalence of inadequacy are vitamin E, folate, and magnesium. Differences by NSLP or SBP participation status are small for children 4 to 8 years and inconsistent for older children.

Table 8d

Usual Intake of Dietary Fiber: FSP and WIC Participants

		Usual Intake Distributions (g/d)					
	AI[a]	10th	25th	Median	Mean	75th	90th
FSP[b] participants and income-eligible nonparticipants							
Kids 4 - 8, FSP	25	8	10	12	13	15	17
Kids 4 - 8, not in FSP	25	9	10	12	12	14	16
Kids 9 - 13, FSP	31/26	9	10	12	12	15	17
Kids 9 - 13, not in FSP	31/26	9	11	13	13	15	18
Males 14 - 18, FSP	38	12	14	15	16	17	19
Males 14 - 18, not in FSP	38	11	13	15	15	18	20
Males 19 - 30, FSP	38	10	13	17	18	22	27
Males 19 - 30, not in FSP	38	11	14	19	20	25	31
Males 31 - 50, FSP	38	9	12	16	17	21	27
Males 31 - 50, not in FSP	38	10	14	18	19	23	28
Males 51+, FSP	30	6	9	13	15	19	26
Males 51+, not in FSP	30	8	11	15	16	19	25
Females 14 - 18, FSP	26	9	11	12	12	14	16
Females 14 - 18, not in FSP	26	12	12	13	13	14	15
Females 19 - 30, FSP	25	7	8	11	11	13	16
Females 19 - 30, not in FSP	25	8	10	13	13 *	16	20
Females 31 - 50, FSP	25	6	8	12	13	16	21
Females 31 - 50, not in FSP	25	7	9	12	12	15	19
Females 51+, FSP	21	7	9	12	12	15	18
Females 51+, not in FSP	21	8	10	12	13	15	18
WIC[c] participants and income-eligible nonparticipants							
Infants < 1, WIC	…	0	1	2	3	4	7
Infants < 1, not in WIC	…	0	1	2	3	5	8
Toddlers 1 - 3, WIC	19	4	6	9	9	12	15
Toddlers 1 - 3, not in WIC	19	6	7	9	9	11	14

Source: 1994-1996, 1998 CSFII.

[a]AI = Adequate Intake.

[b]FSP = Food Stamp Program.

[c]WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

*(**): p-value for difference in mean intakes between participants and income-eligible nonparticipants is < 0.05(0.01)

Table 9a

Usual Nutrient Intake: Micronutrients, NSLP and SBP Participants

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
	Vitamin C (mg/d)								**Vitamin E (mg/d)**							
NSLP[c] participants and nonparticipants									**NSLP participants and nonparticipants**							
Kids 4 - 8, NSLP	47	65	91	99	124	161	22	< 1	5	5	6	6	7	8	6	42.1
Kids 4 - 8, not in NSLP	52	68	90	95	117	145	22	< 1	4	5	6	6	7	8	6	49.4
Kids 9 - 13, NSLP	48	64	87	93	115	146	39	4.4	5	6	7	7	9	11	9	76.9
Kids 9 - 13, not in NSLP	45	64	93	103	131	174	39	6.6	5	6	7	8	9	11	9	74.7
Males 14 - 18, NSLP	60	83	117	128	161	210	63	13.7	6	7	9	9	11	13	12	85.5
Males 14 - 18, not in NSLP	44	64	95	108	137	188	63	26.3	6	8	9	10	11	13	12	82.0
Females 14 - 18, NSLP	46	63	89	98	123	162	75	21.7	5	6	7	7	7	8	12	100.0
Females 14 - 18, not in NSLP	38	53	77	86	109	146	75	30.9	5	6	7	7	7	8	12	100.0
SBP[d] participants and nonparticipants									**SBP participants and nonparticipants**							
Kids 4 - 8, SBP	50	67	90	96	119	150	22	< 1	5	6	7	7	7	8	6	26.2
Kids 4 - 8, not in SBP	47	63	87	94	117	152	22	< 1	5	5	6	6	7	8	6	44.8
Kids 9 - 13, SBP	57	72	92	97	117	143	39	1.5	4	5	7	7	9	11	9	79.5
Kids 9 - 13, not in SBP	47	64	89	97	121	157	39	5.3	5	6	7	8	9	12	9	72.1
	Folate (mcg/d)								**Calcium (mg/d)**							
NSLP participants and nonparticipants									**NSLP participants and nonparticipants**							
Kids 4 - 8, NSLP	162	205	261	275	330	404	160	9.4	591	715	864	884	1,031	1,200	**800**	…
Kids 4 - 8, not in NSLP	164	202	252	261	310	369	160	9.0	586	717	880	901	1,062	1,243	**800**	…
Kids 9 - 13, NSLP	160	199	250	261	312	376	250	49.8	598	734	908	936	1,108	1,310	**1,300**	…
Kids 9 - 13, not in NSLP	168	209	266	280	336	410	250	42.9	605	753	942	974	1,160	1,382	**1,300**	…
Males 14 - 18, NSLP	180	236	312	333	408	512	330	55.4	608	811	1,097	1,181	1,458	1,860	**1,300**	…
Males 14 - 18, not in NSLP	185	232	294	308	369	448	330	63.3	663	852	1,106	1,164	1,412	1,738	**1,300**	…
Females 14 - 18, NSLP	127	160	203	213	256	311	330	92.9	423	565	754	793	979	1,215	**1,300**	…
Females 14 - 18, not in NSLP	136	165	204	215	253	307	330	93.5	413	516	650	676 *	808	971	**1,300**	…
SBP participants and nonparticipants									**SBP participants and nonparticipants**							
Kids 4 - 8, SBP	173	208	256	266	312	373	160	6.4	619	728	860	873	1,004	1,143	**800**	…
Kids 4 - 8, not in SBP	161	204	260	272	327	398	160	9.8	596	722	877	897	1,051	1,222	**800**	…
Kids 9 - 13, SBP	170	200	238	242	279	321	250	58.1	672	763	871	880	987	1,100	**1,300**	…
Kids 9 - 13, not in SBP	160	203	261	277	335	415	250	45.2	578	724	914	948	1,136	1,363	**1,300**	…
	Magnesium (mg/d)								**Vitamin A (mcg RAE)**							
NSLP participants and nonparticipants									**NSLP participants and nonparticipants**							
Kids 4 - 8, NSLP	165	189	217	221	249	282	110	< 1	410	517	656	690	825	1,011	275	1.3
Kids 4 - 8, not in NSLP	168	193	223	225	255	285	110	< 1	482	591	730	760	894	1,075	275	< 1
Kids 9 - 13, NSLP	166	196	231	238	273	317	200	27.8	428	547	705	747	898	1,117	420	9.2
Kids 9 - 13, not in NSLP	187	216	253	258	295	336	200	15.7 **	447	562	714	747	896	1,088	420	7.5
Males 14 - 18, NSLP	208	252	310	321	378	447	340	62.2	398	562	803	890	1,122	1,491	630	32.2

	Usual Intake Percentiles						Assessing Inadequacy		Usual Intake Percentiles						Assessing Inadequacy	
	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]	10th	25th	Median	Mean	75th	90th	EAR[a]	% Inadeq[b]
Males 14 - 18, not in NSLP	216	258	313	322	375	439	340	62.1	420	583	820	897	1,126	1,473	630	30.0
Females 14 - 18, NSLP	157	183	216	220	252	288	300	92.9	282	388	544	599	748	984	485	40.8
Females 14 - 18, not in NSLP	142	169	205	212	247	290	300	92.1	283	375	511	565	695	914	485	45.4
SBP participants and nonparticipants									**SBP participants and nonparticipants**							
Kids 4 - 8, SBP	175	195	219	222	246	273	110	< 1	405	494	608	630	743	883	275	< 1
Kids 4 - 8, not in SBP	166	191	221	224	254	285	110	< 1	428	548	706	753	904	1,134	275	1.2
Kids 9 - 13, SBP	176	195	217	219	241	265	200	30.1	458	544	652	672	778	911	420	5.7
Kids 9 - 13, not in SBP	169	201	241	248	287	336	200	24.3	425	544	700	745	894	1,117	420	9.5
				Iron (mg/d)								**Zinc (mg/d)**				
NSLP participants and nonparticipants									**NSLP participants and nonparticipants**							
Kids 4 - 8, NSLP	9.5	11.3	13.5	14.1	16.2	19.3	4.1	<1	7.1	8.3	9.8	10.1	11.6	13.4	4.0	< 1
Kids 4 - 8, not in NSLP	10.0	11.6	13.6	14.0	16.0	18.6	4.1	<1	6.9	7.9	9.3	9.5	10.8	12.4	4.0	< 1
Kids 9 - 13, NSLP	10.9	12.9	15.3	15.8	18.2	21.3	5.9	<1	7.9	9.3	11.0	11.4	13.0	15.2	7.0	4.2
Kids 9 - 13, not in NSLP	10.4	12.6	15.6	16.4	19.2	23.3	5.9	<1	7.8	9.2	11.0	11.4	13.2	15.5	7.0	4.9
Males 14 - 18, NSLP	13.0	15.9	19.8	20.7	24.5	29.6	7.7	<1	10.1	12.1	14.7	15.2	17.7	20.9	8.5	3.1
Males 14 - 18, not in NSLP	13.6	16.1	19.2	19.9	23.0	27.2	7.7	<1	10.7	12.1	13.9	14.3	16.0	18.3	8.5	1.2
Females 14 - 18, NSLP	9.1	11.1	13.5	13.9	16.3	19.2	7.9	10.0	7.2	8.6	10.3	10.6	12.2	14.2	7.3	10.7
Females 14 - 18, not in NSLP	8.3	9.9	11.9	12.5	14.4	17.4	7.9	14.5	6.1	7.2	8.6	8.8	10.2	11.7	7.3	26.5
SBP participants and nonparticipants									**SBP participants and nonparticipants**							
Kids 4 - 8, SBP	10.0	11.5	13.3	13.7	15.5	17.8	4.1	<1	8.0	8.9	10.0	10.2	11.3	12.6	4.0	< 1
Kids 4 - 8, not in SBP	9.6	11.4	13.8	14.3	16.6	19.6	4.1	<1	7.0	8.2	9.7	9.9	11.4	13.1	4.0	< 1
Kids 9 - 13, SBP	10.7	12.1	13.9	14.1	15.9	17.9	5.9	<1	7.8	8.9	10.3	10.6	12.0	13.6	7.0	4.0
Kids 9 - 13, not in SBP	10.4	12.6	15.4	16.2	18.8	22.8	5.9	<1	7.6	9.0	10.9	11.2	13.0	15.3	7.0	6.0

Source: 1994-1996, 1998 CSFII.

[a]EAR = Estimated Average Requirement. For Vitamin C, the EAR is 35 mg/d higher for smokers. For calcium, the value is an AI = Adequate Intake.

[b]For most nutrients, the % Inadequate = % < EAR. For iron, the probability approach is used to estimate the % Inadequate.

[c]NSLP = National School Lunch Program.

[d]SBP = School Breakfast Program.

*(**): p-value for difference between NSLP/SBP participants and nonparticipants is <0.05(0.01)

Table 9a

Table 9b

Estimated Energy Requirements and Usual Intake of Food Energy: NSLP and SBP Participants

	Usual and required intake percentiles (kcal)							Usual and required intake percentiles (kcal)					
	10th	25th	Median	Mean	75th	90th		10th	25th	Median	Mean	75th	90th
NSLP[a] participants and nonparticipants													
Kids 4 - 8, NSLP							Kids 4 - 8, not in NSLP						
Usual intake	1,416	1,602	1,823	1,854	2,071	2,328	Usual intake	1,443	1,606	1,784	1,799	1,975	2,172
EER[b]	1,336	1,458	1,619	1,635	1,796	1,963	EER	1,337	1,448	1,580	1,598	1,729	1,909
Kids 9 - 13, NSLP							Kids 9 - 13, not in NSLP						
Usual intake	1,481	1,721	2,002	2,044	2,318	2,659	Usual intake	1,577	1,810	2,098	2,135	2,420	2,741
EER	1,658	1,806	2,013	2,076	2,264	2,667	EER	1,602	1,781	1,952	2,025	2,238	2,520
Males 14 - 18, NSLP							Males 14 - 18, not in NSLP						
Usual intake	1,982	2,353	2,829	2,911	3,379	3,944	Usual intake	1,903	2,247	2,686	2,761	3,193	3,714
EER	2,414	2,622	2,897	2,906	3,170	3,374	EER	2,468	2,695	2,913	2,983	3,211	3,570
Females 14 - 18, NSLP							Females 14 - 18, not in NSLP						
Usual intake	1,438	1,672	1,950	1,970	2,245	2,527	Usual intake	1,321	1,540	1,809	1,841	2,107	2,402
EER	1,845	1,951	2,068	2,114	2,192	2,468	EER	1,863	1,987	2,100	2,132	2,236	2,451
SBP[c] participants and nonparticipants													
Kids 4-8, SBP							Kids 4-8, not in SBP						
Usual intake	1,524	1,676	1,856	1,870	2,049	2,235	Usual intake	1,435	1,611	1,815	1,837	2,037	2,265
EER	1,299	1,439	1,584	1,604	1,757	1,886	EER	1,339	1,458	1,608	1,630	1,793	1,954
Kids 9-13, SBP							Kids 9-13, not in SBP						
Usual intake	1,682	1,840	2,015	2,026	2,198	2,382	Usual intake	1,463	1,719	2,044	2,098	2,419	2,803
EER	1,544	1,794	1,975	2,037	2,220	2,621	EER	1,641	1,806	1,990	2,064	2,269	2,629

Source: 1994-1996, 1998 CSFII.

[a]NSLP = National School Lunch Program.

[b]EER = Estimated Energy Requirement.

[c]SBP = School Breakfast Program.

Usual intakes of food energy are close to the estimated energy requirement distributions for the school-age children, regardless of whether they participate in the NSLP or SBP (Table 9b). Although children 4 to 8 years have mean energy intake about 13 percent higher than mean EER and females 14 to 18 years have mean energy intake less than mean EER, the differences are not as pronounced as observed for many of the adult subgroups.

The usual intake of macronutrients shows high percentages with usual fat intakes, and low percentages with usual carbohydrate and protein intakes, that fall outside the AMDRs (Table 9c). The percentage with usual fat intakes above the upper bound of the AMDR is higher for three of the four NSLP subgroups and both SBP subgroups than for nonparticipants. The prevalence of inadequate protein and carbohydrate intake is relatively low for all NSLP and SBP subgroups.

Table 9c

Usual Nutrient Intake: Macronutrients, NSLP and SBP Participants

	Fat		Carbohydrate		Protein	
	%< AMDR[a]	% > AMDR	% Inadeq[b]	% < AMDR	% Inadeq	% outside AMDR
NSLP[c] Participants and Nonparticipants						
Kids 4-8, NSLP	< 1	28.1	< 1	1.4	< 1	< 1
Kids 4-8, not in NSLP	1.9	16.9*	< 1	0.6	< 1	< 1
Kids 9-13, NSLP	< 1	31.5	< 1	1.0	2.5	< 1
Kids 9-13, not in NSLP	2.2	17.7*	< 1	0.4	< 1	< 1
Males 14-18, NSLP	3.1	34.8	< 1	2.4	< 1	< 1
Males 14-18, not in NSLP	1.3	22.8	< 1	1.1	2.4	< 1
Females 14-18, NSLP	2.1	30.4	< 1	2.6	2.4	< 1
Females 14-18, not in NSLP	5.8	30.5	< 1	6.6	10.4	3.4
SBP[d] Participants and Nonparticipants						
Kids 4-8, SBP	< 1	33.3	< 1	1.5	< 1	< 1
Kids 4-8, not in SBP	< 1	23.2*	< 1	1.0	< 1	< 1
Kids 9-13, SBP	< 1	47.9	< 1	1.4	1.5	< 1
Kids 9-13, not in SBP	< 1	26.4*	< 1	1.2	1.7	< 1

Source: 1994-1996, 1998 CSFII.

[a]AMDR = Acceptable Macronutrient Distribution Range

[b]% Inadequate = % with usual intakes < EAR (Estimated Average Requirement).

[c]NSLP = National School Lunch Program

[d]SBP = School Breakfast Program

*(**): p-value for difference between NSLP/SBP participants and nonparticipants is < 0.05(0.01)

As with all other subgroups examined, dietary fiber intakes are far less than requirements (Table 9d). Differences on dietary fiber intakes by NSLP and SBP participation status are small.

Table 9d

Usual Intake Distributions of Dietary Fiber: NSLP and SBP Participants

	Usual Intake Distributions (g/d)						
	AI[a]	10th	25th	Median	Mean	75th	90th
NSLP[b] Participants and Nonparticipants							
Kids 4-8, NSLP	25	9	10	12	12	14	16
Kids 4-8, not in NSLP	25	9	10	12	12	14	16
Kids 9-13, NSLP	31/26	9	11	13	13	16	19
Kids 9-13, not in NSLP	31/26	10	12	14	15*	17	20
Males 14-18, NSLP	38	12	14	17	18	21	25
Males 14-18, not in NSLP	38	11	14	17	17	21	24
Females 14-18, NSLP	26	9	10	12	12	14	16
Females 14-18, not in NSLP	26	9	11	13	13	15	18
SBP[c] Participants and Nonparticipants							
Kids 4-8, SBP	25	10	11	13	13	14	16
Kids 4-8, not in SBP	25	9	10	12	12	14	16
Kids 9-13, SBP	31/26	9	10	12	12	14	16
Kids 9-13, not in SBP	31/26	9	11	14	14*	17	21

Source: 1994-1996, 1998 CSFII.
[a]AI = Adequate Intake
[b]NSLP = National School Lunch Program
[c]SBP = School Breakfast Program
*(**): p-value for difference in mean intakes between NSLP/SBP participants and nonparticipants is < 0.05(0.01)

C. PREVALENCE OF EXCESSIVE USUAL INTAKE LEVELS

Assessing nutrient adequacy involves determining not just the prevalence of inadequate intakes but also the likelihood of excessive intakes. With the newly released Tolerable Intake Levels (ULs), the risk of excessive intakes is assessed by estimating the percentage with usual intakes above the UL. The ULs vary considerably across nutrients; for some nutrients, the UL applies to intakes from foods, beverages, and supplements; for other nutrients, the UL applies to intakes from supplements or fortified foods only; and for others, the UL is not yet determined. Since the CSFII data do not include intakes from supplements, the analysis of the prevalence of

excessive intake levels could not be conducted for nutrients where the UL applies to intakes from supplements, pharmacological agents, synthetic forms of the nutrient, or fortified foods only. As a result, using the CSFII data, estimates of the percentage with intakes above the UL are obtained only for vitamin C, calcium, iron, and zinc. In addition, given that the CSFII data were collected prior to more recent fortification of foods with calcium, the prevalence of intakes above the UL for calcium may be lower for some subgroups than what would be observed with more recent dietary intake data.

The principal findings regarding the percentage with usual intakes from food and beverages exceeding the UL are the following:[3]

- For vitamin C and iron, the prevalence of excessive intake is very low. For vitamin C, the prevalence is zero; the highest value of usual vitamin C intake is far less than the UL for all subgroups examined. For iron, less than 1 percent of each subgroup has usual intakes exceeding the UL.
- For almost all subgroups, the 99th percentile of usual calcium intake is less than the UL, suggesting a low prevalence of excessive calcium intake from food. Adolescent males and males 19 to 30 years have 99th percentiles of usual calcium intake close to the UL, suggesting that, at most, only 1 to 2 percent of these two subgroups may be at risk of excessive calcium intake.
- The prevalence of excessive zinc intake is low for older children, adolescents, and adults, but is high for toddlers and young children.
  - About 60 percent of WIC and income-eligible nonparticipating children 1 to 3 years of age have usual zinc intakes exceeding the UL.
  - More than 10 percent of children 4 to 8 years of age have usual zinc intakes exceeding the UL.

Because the CSFII data do not include intakes from supplements, these estimates are underestimates of the percentage exceeding the UL. As discussed earlier, NHANES III data do

[3] Because of the sheer number of subgroups and nutrients, and because the prevalence of excessive intake levels is fairly low, detailed tables on the percentage with usual intakes above the UL are not presented. The text describes the noteworthy analysis findings on the percentage exceeding the UL.

include information on supplement intake, based on a food-frequency type of questionnaire on supplement use. Because supplement use data are from a food frequency type of questionnaire, however, there are some methodological challenges in combining dietary recall data on foods consumed with dietary recall data on supplements consumed.

To examine the effects of supplement use on estimates of the prevalence of excessive intakes, we conducted an additional analysis, based on NHANES III data, combining dietary recall data with food frequency data on supplement use to obtain estimates of usual intake from food and supplements. Specifically, estimates of usual intake at the individual level were added to reported usual supplement intakes of individuals from a food frequency questionnaire for a selected group of nutrients and subgroups—vitamin C, zinc, and vitamin B_{12} for male and female older adults and adolescent females. Estimates of the percentage with usual intakes exceeding the UL was less than 1 percent and was consistent with findings from the CSFII.